DECEMBER 2, 1937

THE IRON AGE

PRINCIPAL FERRO-ALLOYS AND METALS

CHROMIUM
Low-Carbon Ferrochrome (in grades, maximum 0.06% to maximum 2.00% carbon)
High-Carbon Ferrochrome (maximum 6.00% carbon)
High-Nitrogen Ferrochrome
Chromium Metal
Chromium-Copper
Miscellaneous Chromium Alloys

MANGANESE
Standard Ferromanganese 78 to 82%
Low-Carbon Ferromanganese
Medium-Carbon Ferromanganese
Spiegeleisen
Manganese Metal
Manganese-Copper
Miscellaneous Manganese Alloys

SILICON
Ferrosilicon 15%
Ferrosilicon 50%
Ferrosilicon 75%
Ferrosilicon 80 to 90%
Ferrosilicon 90 to 95%
Refined Silicon (minimum 97% silicon)
Miscellaneous Silicon Alloys

SILICO-MANGANESE
All grades including Silico-Spiegel

CALCIUM
Calcium-Silicon
Calcium-Aluminum Silicon
Calcium-Manganese-Silicon

TUNGSTEN

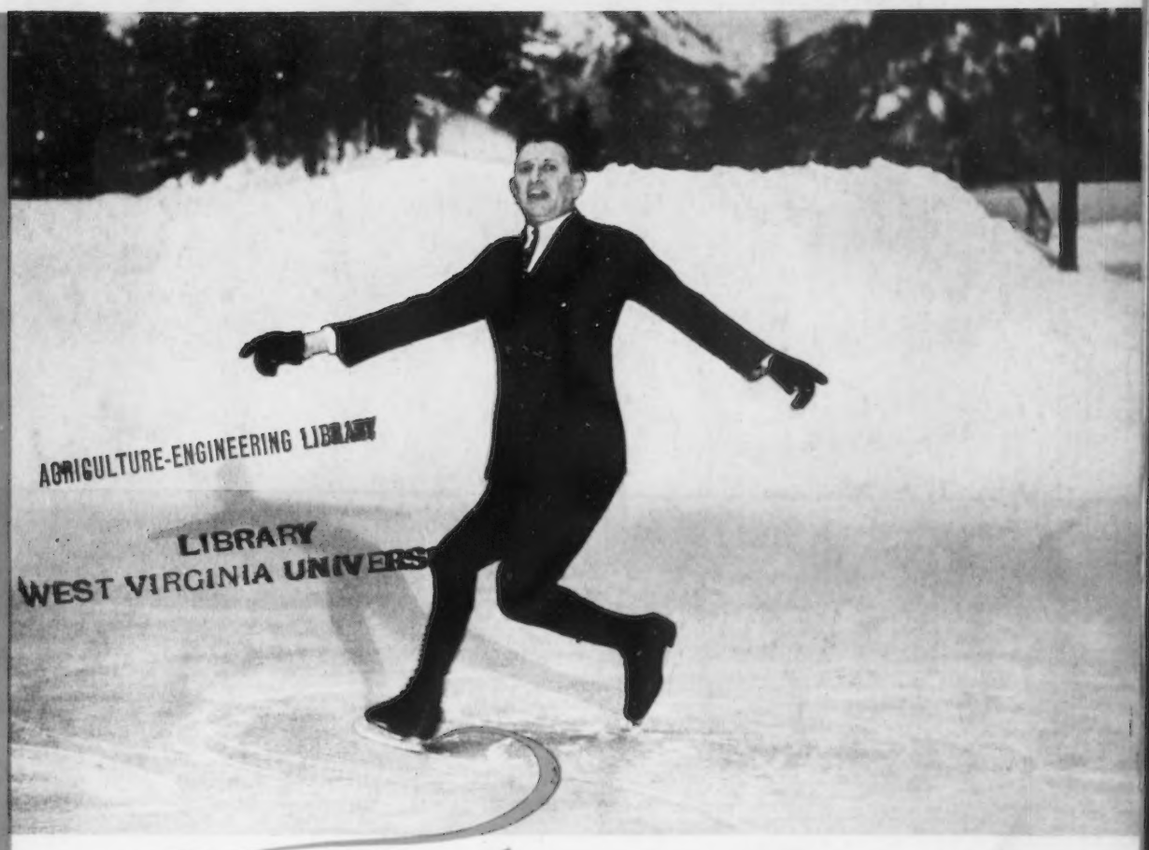
ZIRCONIUM
12 to 15% Zirconium
35 to 40% Zirconium
Aluminum-Zirconium

VANADIUM
All grades

BRIQUETS
(Patented)
Chrome Briquets
Manganese Briquets
Silicon Briquets

COLUMBIUM

PRODUCTS OF A UNIT OF UCC UNION CARBIDE AND CARBON CORPORATION



STRONG

TOUGH ELASTIC • CORROSION RESISTANT ROPE

Where there's a job to be done—and done right; where a wire rope must stand up under the severest conditions . . . automatically specify ELEPHANT BRAND PHOSPHOR BRONZE!

Hoisting, Tiller, Rigging or Transmission Rope . . . they're all stronger, give far longer service, when they're made from this quality metal.

Phosphor Bronze Ropes are impervious to corrosive fumes, acid waters and moisture, too—and require no artificial coating. They're flexible and dependable.

Hoisting Rope, with 114 wires is available, for prompt delivery, in 1/8" to 3/4" diameter; Tiller Rope, with 225 wires, in 1/8" to 3/4" diameter; Rigging or Transmission Rope, with 42 wires, in 1/4" to 3/4" diameter.

Complete information and prices on request.

Also, INGOTS • CASTINGS • RODS • WIRE • SHEETS • TUBING

THE PHOSPHOR BRONZE SMELTING CO., 2210 Washington Ave., Phila.

ELEPHANT BRAND PHOSPHOR BRONZE

Custom Service

IN FINE STEELS IT'S LUDLUM

The smart woman of fashion insists on furs of custom make, to suit her requirements exactly. The smart manufacturer likewise insists on the fine steels best suited to his product or his manufacturing process. From long experience, he knows that Ludlum can give him the exact type or analysis of steel and that Ludlum service will insure the right selection.

This service reaches directly into your plant, with engineers available to study your problems and make dependable suggestions on material and methods. It is *always* open to you, without charge or obligation. Just write to Research Dept., Ludlum Steel Co., 1202 A Street, Watervliet, N. Y.

The suggestions of Ludlum representatives often effect substantial economies, like the one made to a Southern paper manufacturer. In this plant several small geared bronze pumps were formerly used. Their cost was $22.50 each; their service life only a week. On Ludlum's recommendation a Nitralloy pump, costing $75.00, was tried out. It has operated 24 hours a day, 6½ days a week, *for 18 months*—and still shows no perceptible wear. The manufacturer is now saving over $1120 a year on *every* pump.

● *Photograph, courtesy of* STOFSKY FURS, New York City

LUDLUM

FINE STEELS SINCE 1854

TOOL · STAINLESS · CARBON · ALLOY

THE IRON AGE, published every Thursday by the *CHILTON CO. (INC.)*. Publication Office, Chestnut & 56th Sts., Philadelphia, Pa. Editorial and Executive Offices, 239 W. 39th St., New York, N. Y. Entered as second class matter November 8, 1932, at the Post Office at Philadelphia under Act of March 3, 1879. $6.00 a year in U. S., Canada $8.50, Foreign $12.00. Vol. 140, No. 23.

KEEP ON "*Sweeping the Corners*"

IT'S easy to forget, in good times like these, the lessons we learned in the depression. Easy—and dangerous. Most companies learned to "sweep up the corners" for waste during the depression—little things that saved a penny here, a few cents there, but in the aggregate amounted to an important total.

For the sake of your present profit and future security, don't forget those little things now. *Cut out waste wherever you can find it.*

Here are nine ways to do it. A modern Warner & Swasey Turret Lathe, because of its improved accuracy, speed, power, simplicity—

1—reduces—in many cases *ends*—scrap loss.
2—cuts cost per piece as much as 50%.
3—is easier for the operator, and so minimizes costly fatigue
4—often reduces number of operations.
5—increases production as much as 30%.
6—reduces setting-up time.
7—often reduces amount of material used—in one case by 30%.
8—improves accuracy of finished product.
9—speeds production—enables you to deliver more quickly.

These are nine "corners" out of which you can sweep waste by a new Warner & Swasey Turret Lathe. And remember—every one of these is a direct addition to net profit. Let us give you the facts on your work.

WARNER & SWASEY
Turret Lathes
Cleveland

New Industrial Literature

A REVIEW OF CURRENT CATALOGS AND CIRCULARS • A TIME SAVING SERVICE FOR BUYERS

Order by number literature wanted. No Cost: No Obligation. Address The Iron Age 239 West 39th St. New York City

BELT CONVEYORS AND BUCKET ELEVATORS.—Stephens-Adamson Mfg. Co. Catalog No. 47, 124 pages, describing and illustrating a complete line of belt conveyors, carriers, trippers, pulleys, shafts, bearings, belting and bucket elevators for handling bulk materials. Illustrations include numerous line drawings, and tabular data include tables of dimensions and capacities. Bulletin 12-95.

SEALED BALL BEARINGS. — New Departure division, General Motors Corp. Booklet D gives the principles involved in the N-D-Seal bearing, and the need for this type bearing. Numerous case histories are cited and illustrated in which this type bearing has been used with success. Bulletin 12-96.

HYDRAULIC GRINDERS. — Landis Tool Co. New catalog No. E-37 describes 16 in. type B plain hydraulic grinders. Machines feature babbitt-lined steel wheel spindle bearings, multiple V-belt drive on end grinding wheel spindle and hydraulic table traverse. Complete specifications and list of standard equipment included. Bulletin 12-97.

WASHERS.—Wrought Washer Mfg. Co. New bulletin entitled "Over 20,000 Varieties" which describes the company's products and services which are available to manufacturers. Bulletin 12-98.

COMPRESSED AIR FILTERS. — Staynew Filter Corp. Folder describes Protectomotor radial fin air filters. Cleaner features a removable filter insert and unusual strength. Use of filter on gas and liquid as well as air lines is illustrated, and capacities and dimensions of various types are listed. Bulletin 12-99.

FRACTIONAL HORSEPOWER MOTORS. —Century Electric Co. 24-page booklet presents information concerning the electrical characteristics and descriptions of all types of fractional horsepower motors, with suggestions as to how they can be most effectively applied to meet the requirements of motor-driven machinery operating in normal and abnormal surroundings. Bulletin 12-100.

FRICTION CLUTCHES. — T. B. Wood's Sons Co. A new flexible clutch designed especially for use on oil, gas and diesel engine drives, or on drives where heavy impact is encountered on either end, is described in this bulletin. Large cutaway drawing illustrates construction features. Bulletin 12-101.

SEAMLESS TUBING. — Timken Roller Bearing Co. Handy pocket size handbook listing standard tolerances, mechanical properties of cold drawn carbon steel seamless tubing, and theoretical weight per lineal foot of tubing from ⅛ in. OD to 10¾ in. OD and wall thickness ranging from .004 in. to 1⅝ in. Bulletin 12-102.

UNIT HEATERS.—Trane Co. Bulletin describes various styles of projection type unit heaters for heating factories, large offices, etc. Unit consists of a fan surrounded by heating coils and is said to provide uniform heat distribution from unusually high ceiling mountings. Bulletin 12-103.

ROADBED DRAINAGE. — Armco Culvert Mfrs. Association. Reprint of an article on "Roadbed Stabilization" which discusses in detail highway subdrains, the use of soil augers, cut slopes, method of installing drain pipes, and contains tables showing the depth of flow and discharges required to move various solids. Bulletin 12-104.

HACK SAW BLADES.—W. O. Barnes Co., Inc. A manual of metal cutting information which discusses proper and improper methods of using hack saw blades, and contains tables of recommended teeth and speeds for cutting various materials. Also describes blades of various metals and gives list prices of same. Bulletin 12-105.

CONVEYOR CHAIN.—Link-Belt Co. Illustrated folder describes new conveyor chain for case, carton, crate and can conveyors in dairies and other bottling plants. It is flexible and quickly detachable and will travel around curves of 12 in. radius. Bulletin 12-106.

HEAT TRANSFER SURFACES. — Young Radiator Co. Bulletin contains descriptions and illustrations of heat transfer units for air conditioning and commercial application. Includes diagrams, technical data and several pages of tables. Bulletin 12-107.

UNIT HEATERS.—Modine Mfg. Co. Bulletin pointing out features of Modine unit heaters. Includes illustrations, cutaway photographs and scenes of actual installations, as well as capacities and auxiliary data. Bulletin 12-108.

FLAME HARDENING.—National Cylinder Gas Co. Folder discusses and points out claimed advantages of National flame hardening. Illustrated. Bulletin 12-109.

DUST COLLECTORS.—Claude B. Schneible. Folder illustrating and describing the junior multi-wash dust collector which is designed for use in places where a simple low cost dust collecting device is needed. Capacities and dimensions are included. Bulletin 12-110.

SPEED CONTROL UNIT.—Reeves Pulley Co. Folder describing Reeves variospeed motodrive, a variable speed control unit combining driving motor, variable speed mechanism and reduction gears in one compact self-contained unit. Diagrams and illustrations are included. Bulletin 12-111.

COUNTING INSTRUMENTS. — Durant Mfg. Co. Folder illustrating many types of productimeters, counting and registering instruments. Descriptions are included. Bulletin 12-112.

WELDING GENERATORS.—Harnischfeger Corp. The difference between separate and self-excited generators for arcwelding, as well as the characteristics of external and internal stabilizations are described with the help of curves, photographs and diagrams. Also discussed are single current control versus double manual control. Bulletin 12-113.

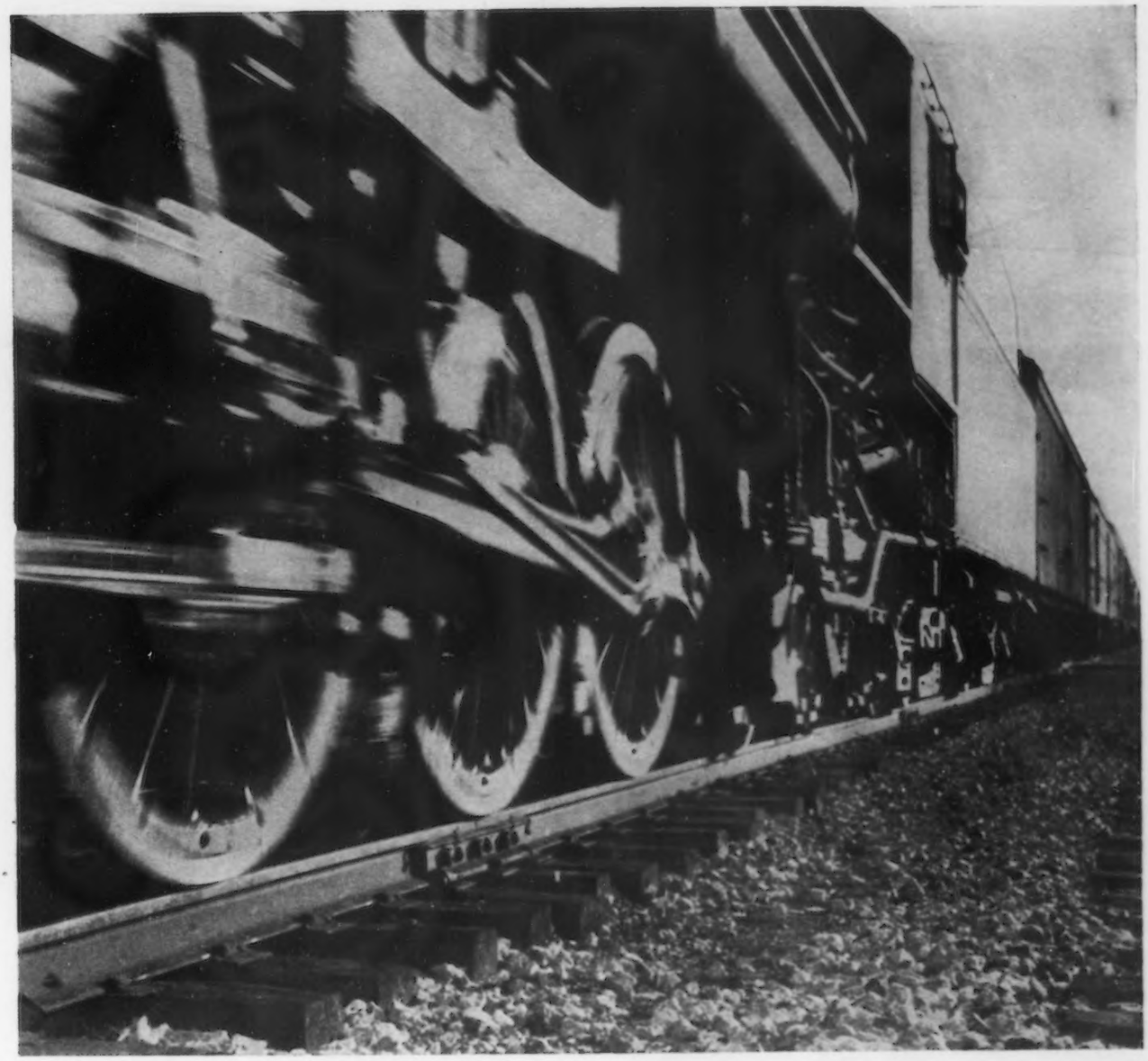
AIR FURNACES. — Despatch Oven Co. Bulletin describing and illustrating with photographs, charts and diagrams, convected air furnaces for heat treating dense and coarse loads. List of users and typical products treated is included. Bulletin 12-114.

AUTOMATIC PULLEYS. — Equipment Engineering Co. Folder describing the Hilo automatic pulley with infinite variable speed and standard constant feed motors. Illustrated and includes engineering data and list prices. Bulletin 12-115.

BORING MACHINE. — Stokerunit Corp. Folder containing descriptive text, illustrations and specifications concerning the Simplex precision boring machine for precision boring of all metals with tungsten carbide tools. Bulletin 12-116.

HYDRAULIC PLANER. — Rockford Machine Tool Co. Bulletin explaining the open side Hy-Draulic planer. Discusses features and advantages and includes illustrations and specifications. Bulletin 12-117.

IF YOU WANT YOUR NEW CATALOG OR LITERATURE LISTED HERE SEND A COPY TO ABOVE ADDRESS



RUBBER PILLOWS FOR RAILROAD BEDS

A typical example of Goodrich development in rubber

MILLIONS of tons of train pound over main-line rails, crunching and grinding the steel into the wooden tie. Naturally ties wear out—cost a tremendous annual sum for replacement.

An inventor had an idea—cut a square opening through the center of the steel tie plate that holds the rail in place; let the rail rest on a pad inserted in this opening, the pad resting directly on the tie, the rail never coming in contact with the metal of the tie plate. Pads of felt, fabric-and-rubber combinations were all tried, but failed. Then the inventor came to Goodrich and asked for rubber able to stand terrific shock and weight without losing its shape or resilience, able to withstand outdoor exposure for years without deterioration.

Goodrich rubber tie plate inserts were made and tested. They entirely eliminate tie wear by the tie plate. They reduce vibration. They increase life of ties indefinitely and lower track-maintenance cost.

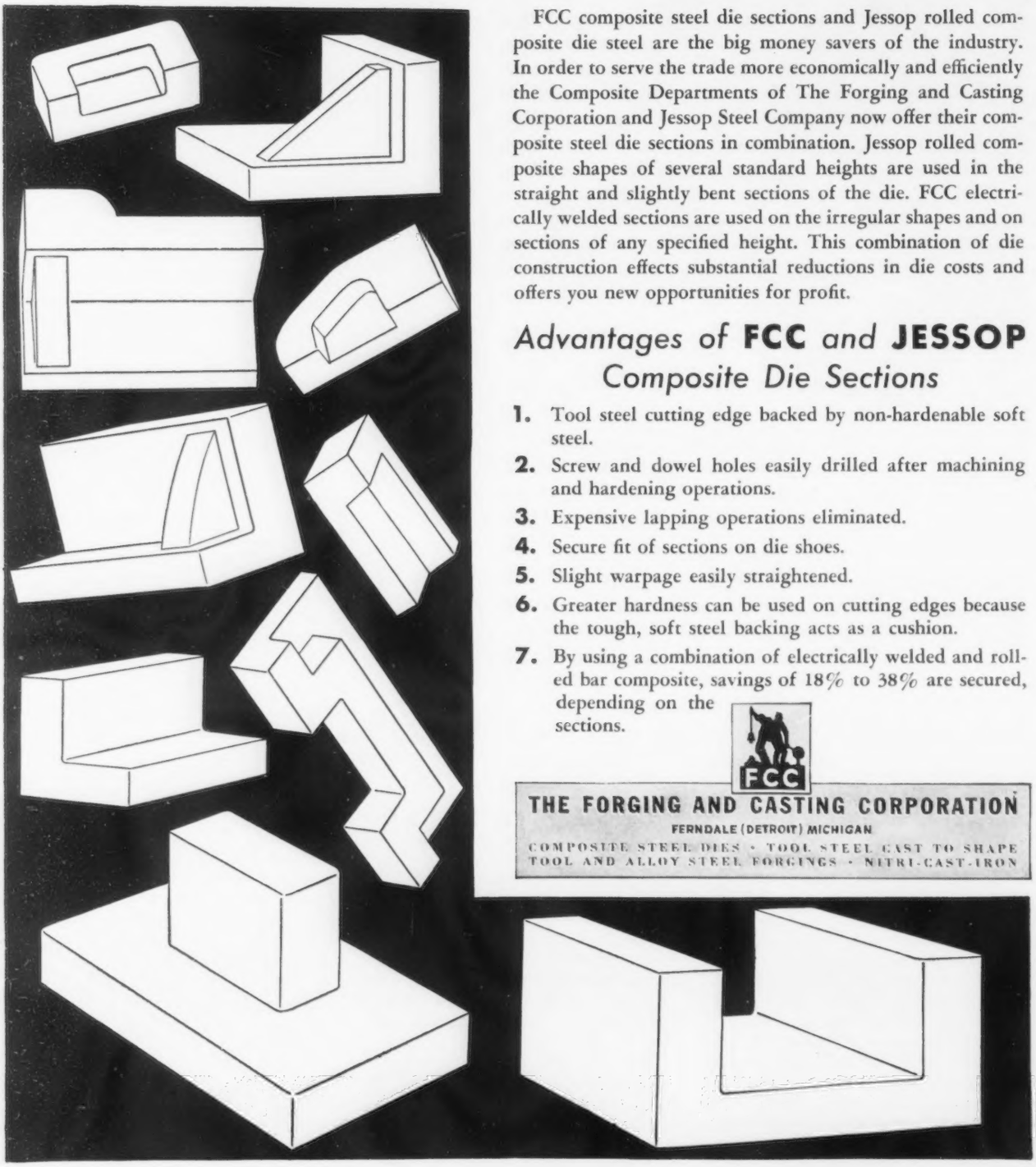
Goodrich was able to supply the rubber needed for this exacting use because of this Company's rubber research and development work. This research has resulted in many kinds of rubber with vastly improved resistance to ageing, and with ability to stand abrasion, flexing, chemicals which would have destroyed rubber as you used to know it. Many of these improvements are used in all Goodrich products—hose, transmission belting, conveyor belting, molded goods—to make them last longer and save money for the buyer. The B. F. Goodrich Company, Mechanical Rubber Goods Division, Akron, Ohio.

Goodrich

ALL *product problems* IN RUBBER

New! FCC COMBINED

ELECTRICALLY WELDED and ROLLED



FCC composite steel die sections and Jessop rolled composite die steel are the big money savers of the industry. In order to serve the trade more economically and efficiently the Composite Departments of The Forging and Casting Corporation and Jessop Steel Company now offer their composite steel die sections in combination. Jessop rolled composite shapes of several standard heights are used in the straight and slightly bent sections of the die. FCC electrically welded sections are used on the irregular shapes and on sections of any specified height. This combination of die construction effects substantial reductions in die costs and offers you new opportunities for profit.

Advantages of **FCC** *and* **JESSOP** *Composite Die Sections*

1. Tool steel cutting edge backed by non-hardenable soft steel.
2. Screw and dowel holes easily drilled after machining and hardening operations.
3. Expensive lapping operations eliminated.
4. Secure fit of sections on die shoes.
5. Slight warpage easily straightened.
6. Greater hardness can be used on cutting edges because the tough, soft steel backing acts as a cushion.
7. By using a combination of electrically welded and rolled bar composite, savings of 18% to 38% are secured, depending on the sections.

FCC

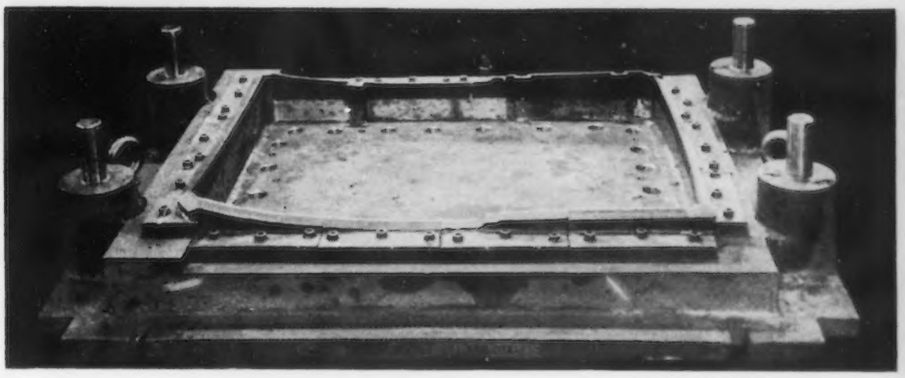
THE FORGING AND CASTING CORPORATION

FERNDALE (DETROIT) MICHIGAN

COMPOSITE STEEL DIES • TOOL STEEL CAST TO SHAPE
TOOL AND ALLOY STEEL FORGINGS • NITRI-CAST-IRON

COMPOSITE DIE CONSTRUCTION

COMPOSITE STEEL DIE SECTIONS



FCC ELECTRICALLY WELDED DIE SECTIONS

A wide range of shapes, sizes and steels may be used in FCC electrically welded die sections. Cutting edges of water, oil or air hardening carbon vanadium or high speed steel are welded on to a soft, relatively inexpensive base, which is non-hardenable and is readily drilled and reamed. Sections of regular and irregular shapes and heights are made to exact specifications.

JESSOP ROLLED DIE SECTIONS

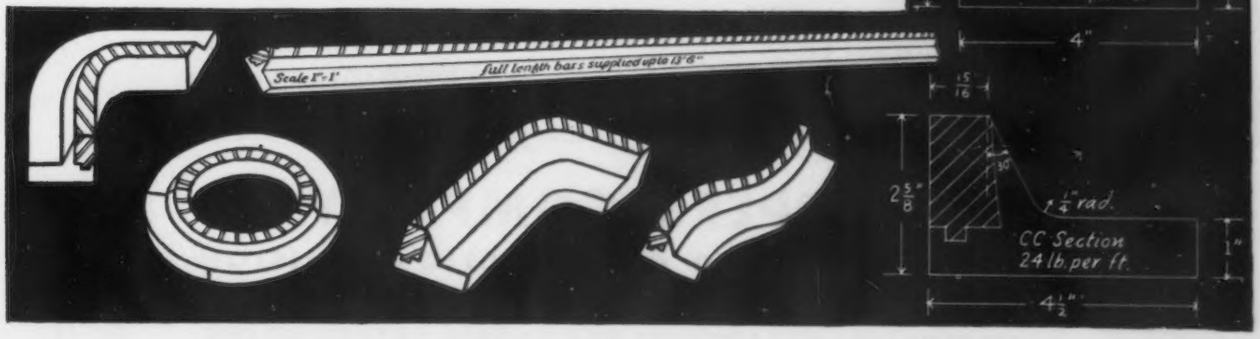
These rolled bar steel shapes are recommended for straight die sections and also for slightly bent sections. The cutting edge is electric-furnace-melted, water-hardening tool steel backed by a tough, non-hardenable steel. Seven different die sections of composite bars are available, in lengths of 8 to 10 feet. The savings range from 28% to 47%.

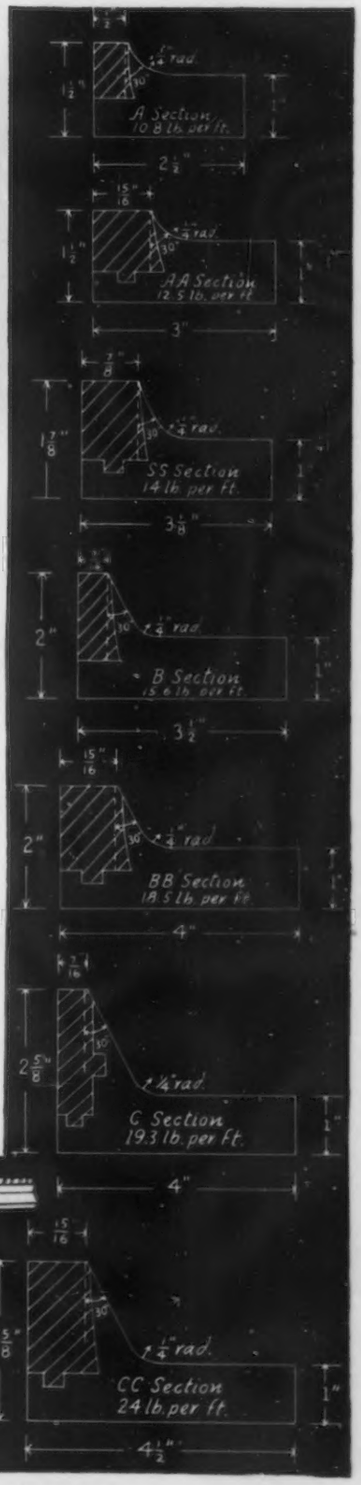
Lower Ultimate Cost!

APPLICATIONS

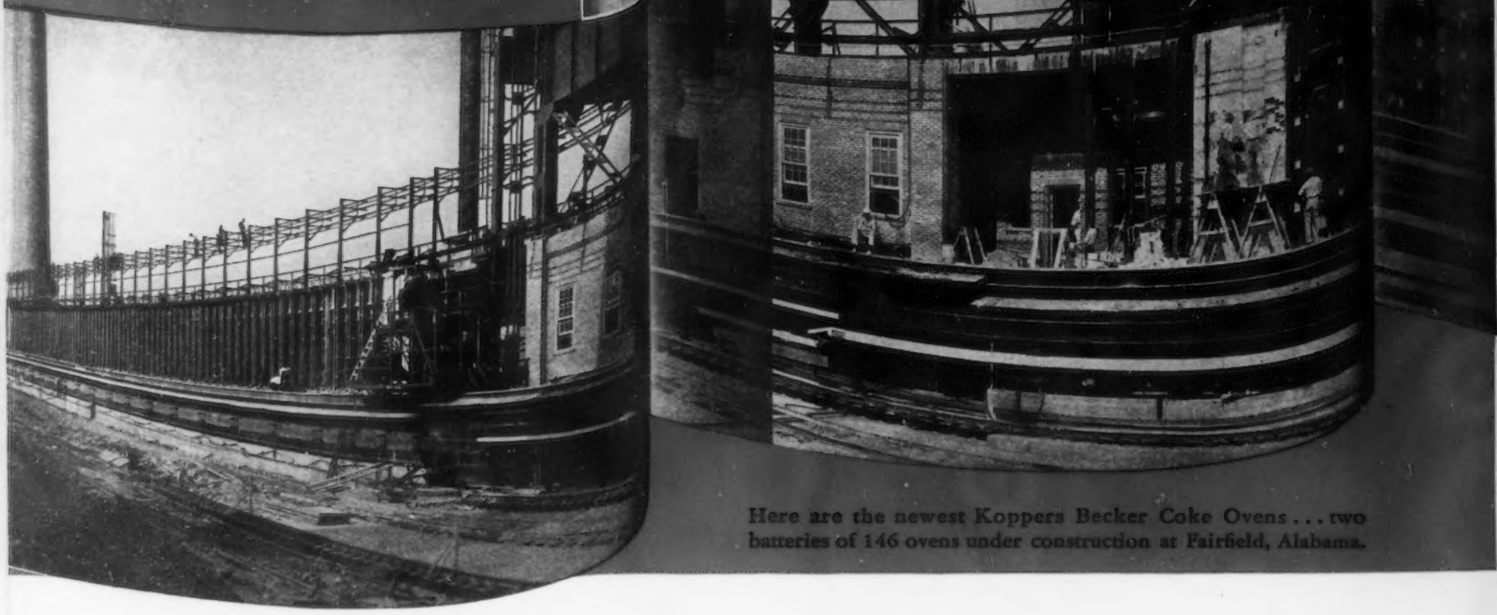
Auto body die work, stove dies, refrigerator panel dies, aeroplane metal sheet shape dies, metal toy dies, railroad car dies, metal container dies, truck body die work, and any application in which sheet metals are to be cut to regular or irregular shapes.

Send for complete information on FCC and Jessop Composite Die Sections and name of nearest distributor. Write to The Forging and Casting Corporation, Ferndale, Michigan, or Jessop Steel Company, Washington, Penna.





THESE BATTERIES OF KOPPERS BECKER OVENS HAVE JUST GONE INTO PRODUCTION



Here are the newest Koppers Becker Coke Ovens . . . two batteries of 146 ovens under construction at Fairfield, Alabama.

In the building era in the steel business since the depression, the Koppers Becker Coke Ovens have proven again that they are the outstanding ovens. Again and again they have been selected for some of the most important steel mill installations.

Recent improvements have made them the most highly mechanized ovens yet developed. They have stronger oven wall construction and greater heat uniformity. The self-sealing doors have entirely eliminated luting and yet provide an absolutely tight metal to metal seal. The new door extractor machine expedites the removal, cleaning and seating of the doors and tightens the door to exactly the proper degree, without chance of human variation.

The result of these and other changes are that the Koppers Becker Ovens produce coke of better quality, with greater yields of tar, benzol and gas, at lower operating and maintenance costs.

All the features of the Koppers Becker Ovens are covered by patents or patent applications are pending.

Let the Koppers engineers consult with you on your coke plant plans, write to Pittsburgh.

KOPPERS COMPANY

ENGINEERING AND CONSTRUCTION DIVISION

ANOTHER CONTRACT FOR 41 KOPPERS BECKER OVENS

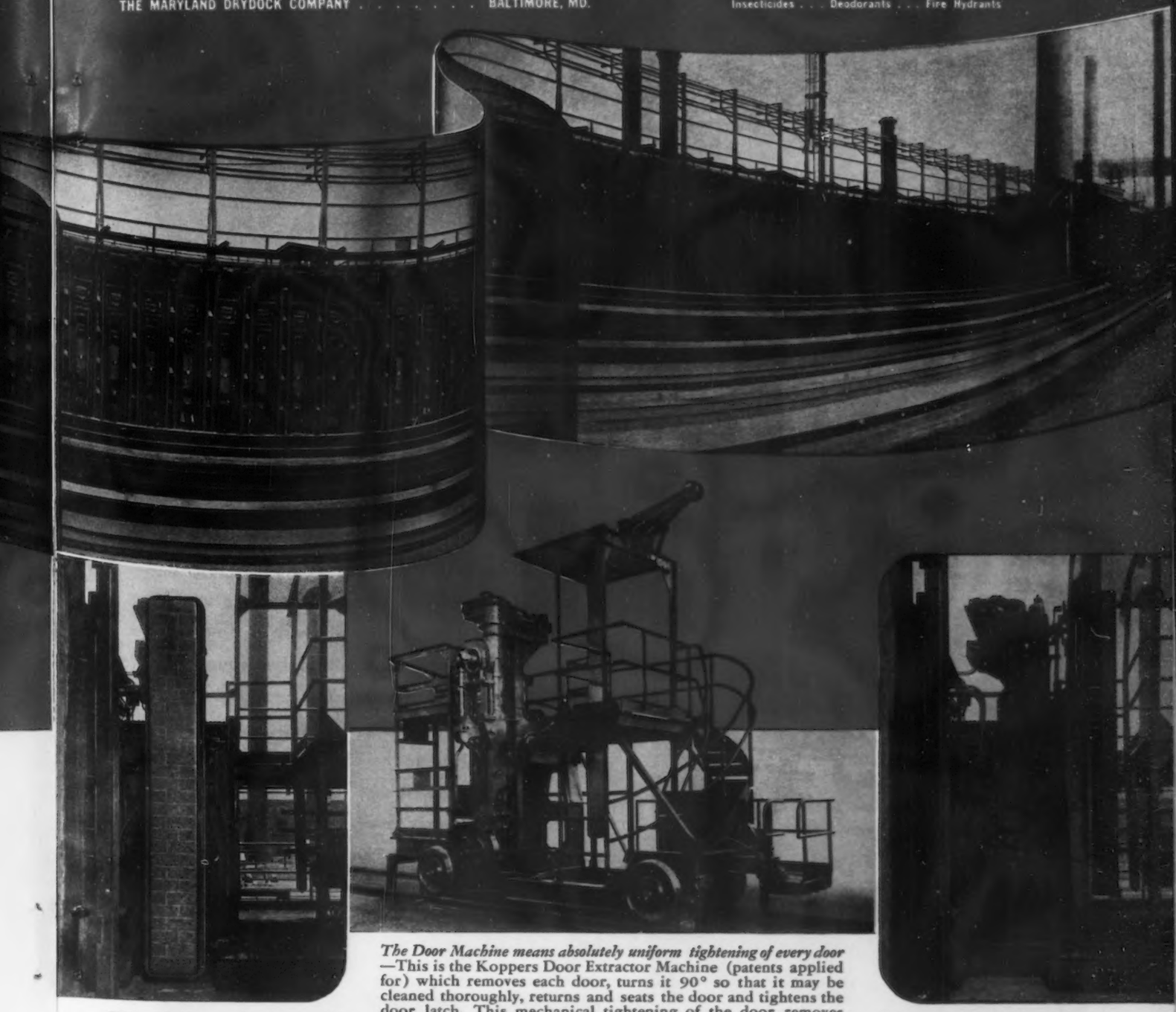
Announcement has just been made by the Colorado Fuel and Iron Corporation of a contract awarded to Koppers Company for 41 Koppers Becker Coke Ovens, of the low differential type, to be built at the company's plant at Pueblo, Col. This plant had previously built 120 Koppers Ovens and later 31 Koppers Becker Ovens.

Koppers Divisions, Subsidiaries and Affiliates Serving the Metal Industries

ENGINEERING AND CONSTRUCTION DIVISION	PITTSBURGH, PA.
KOPPERS-RHEOLAVEUR COMPANY	PITTSBURGH, PA.
BARTLETT HAYWARD DIVISION	BALTIMORE, MD.
TAR AND CHEMICAL DIVISION	PITTSBURGH, PA.
WESTERN GAS DIVISION	FORT WAYNE, IND.
AMERICAN HAMMERED PISTON RING DIVISION	BALTIMORE, MD.
GAS AND COKE DIVISION	PITTSBURGH, PA.
THE KOPPERS COAL COMPANY	PITTSBURGH, PA.
NEW ENGLAND COAL & COKE COMPANY	BOSTON, MASS.
THE WOOD PRESERVING CORPORATION	PITTSBURGH, PA.
NATIONAL LUMBER & CREOSOTING COMPANY	TEXARKANA, ARK.-TEX.
THE WHITE TAR COMPANY OF NEW JERSEY, INC.	KEARNY, N. J.
THE MARYLAND DRYDOCK COMPANY	BALTIMORE, MD.

Koppers Products Serving the Metal Industries

Coke Oven Plants . . . Conveying Systems . . . Liquid Purification Plants . . . Oxide Purification . . . Phenol Removal Plants . . . Benzol Recovery Plants . . . Ore Concentration Plants . . . Sulfur Recovery . . . Water Gas Plants . . . Tar Displacement Systems . . . Tar Extractors . . . Fast's Self-aligning Couplings . . . D-H-S High Tensile Bronze Castings . . . Iron Castings . . . Coal . . . Coal Tipples . . . Coal Washing Plants . . . Coal Drying Plants . . . Coal de-dusting and Dust Collecting Equipment . . . Coal Crushing Plants . . . Coke . . . Steam Accumulators . . . Barges . . . Ships . . . Blast Gates . . . Gas Holders . . . Charging, Clinker and Clean-out Doors . . . Gas, Air and Water Valves . . . Drydocking Facilities . . . Cylinder Packing . . . American Hammered Piston Rings . . . Waterproofing and Dampproofing Materials . . . Roofing Materials . . . Tarmac for plant paving . . . Bituminous-base Paints . . . Lumino Paint . . . Rolling Mill Bronze . . . Treated Timber . . . Disinfectants . . . Insecticides . . . Deodorants . . . Fire Hydrants



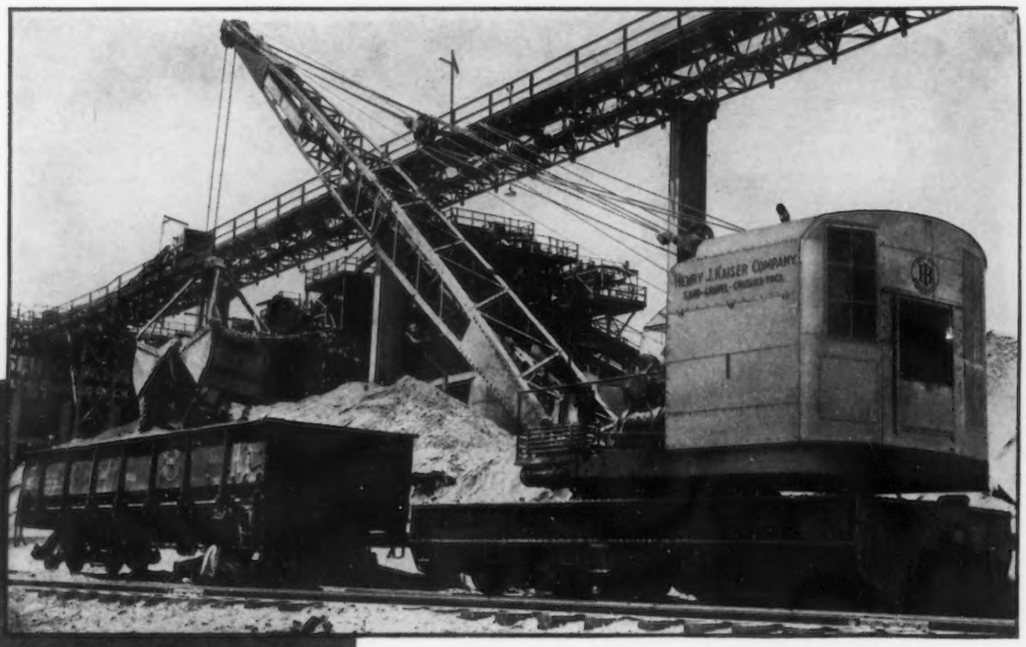
This photograph shows the Koppers door extractor machine in operation. The door has been removed and is ready to be turned to the cleaning position. (see other photo).

The Door Machine means absolutely uniform tightening of every door —This is the Koppers Door Extractor Machine (patents applied for) which removes each door, turns it 90° so that it may be cleaned thoroughly, returns and seats the door and tightens the door latch. This mechanical tightening of the door removes chance of human variations.

This photograph shows the door machine after it has turned the oven door 90° to the cleaning position. It has also raised the door to a position where a man can clean the bottom easily and thoroughly.

KOPPERS

BUILDERS . . . DESIGNERS . . . MANUFACTURERS . . . PRODUCERS . . . DISTRIBUTORS . . . OPERATORS



POWER TO SPARE

but a MISER *on fuel..*

One of the distinct advantages of Industrial Brownhoist Diesel cranes is the way they dig in and pull when the work gets hard — the way they travel at sustained speeds, up to 15 miles per hour.

Another advantage — and an important one — is the increase in working hours and the decrease in fuel costs these Industrial Brownhoists effect. Most owners figure on two extra hours of work a day over a steam crane; many tell us they save from 25% to 50% on fuel. The combination of the two makes a difference of a good many dollars in the course of a year.

Industrial Brownhoist Diesel cranes are built in capacities of 10 to 50 tons and for all kinds of bucket, hook and magnet work. A new booklet, describing all of them, will be sent you, on request.

LOCOMOTIVE CRANES
CRAWLER CRANES
ERECTION CRANES
BRIDGE CRANES

INDUSTRIAL BROWNHOIST

BAY CITY, MICHIGAN

NEW YORK, PHILADELPHIA, PITTSBURGH, CLEVELAND, CHICAGO
Agents in other Principal Cities

PILE DRIVERS
CAR DUMPERS
DOCK MACHINERY
BUCKETS

Select the Rope that Fits Your Job

Protruding wires lap over adjacent wires as a wire rope passes over a sheave thus nicking the adjacent wires and causing rapid destruction of the rope. A broken outer wire in a preformed rope remains in its normal position. A broken outer wire in a non-preformed rope has a decided tendency to protrude. In cases where safety factors permit the continued use of a rope with a few broken wires, the additional service of the preformed rope after the first broken wires appear will in itself warrant the additional cost. Write us about your use of wire rope and we will gladly tell you whether or not preforming will save you money.

•

WICKWIRE SPENCER STEEL COMPANY, *General Offices:* 41 East 42nd Street, New York. *Sales Offices and Warehouses:* Worcester, New York, Chicago, Buffalo, San Francisco, Los Angeles; *Export Sales Dept.:* New York.

WICKWIRE SPENCER SALES CORPORATION, New York, Chattanooga, Tulsa, Portland, Seattle.

WIRE ROPE
by Wickwire Spencer

WICKWIRE SPENCER STEEL COMPANY
41 East 42nd St., New York City
Please send me my free copy of your popular, new money saving manual, "Know Your Ropes".

Name _____

Firm _____

Address _____ IA

City _____ State _____

THE IRON AGE
JANUARY 7, 1937
1887
1937
MERCHANTS AND DISTRIBUTORS OF IRON AND STEEL PRODUCTS FOR HALF A CENTURY
MILNE & CO.
NEW YORK
CHICAGO
BOSTON
NEW ORLEANS
JANUARY 7, 1937
ANNUAL REVIEW NUMBER
THE IRON AGE

From Every Angle—

» the most important issue in the year and one which looms large in the estimation of executives in the metal working field.

» Your product will be brought to the attention of these executives again and again throughout the year if it is featured in it.

» Make your space reservation now.

ANNUAL REVIEW NUMBER

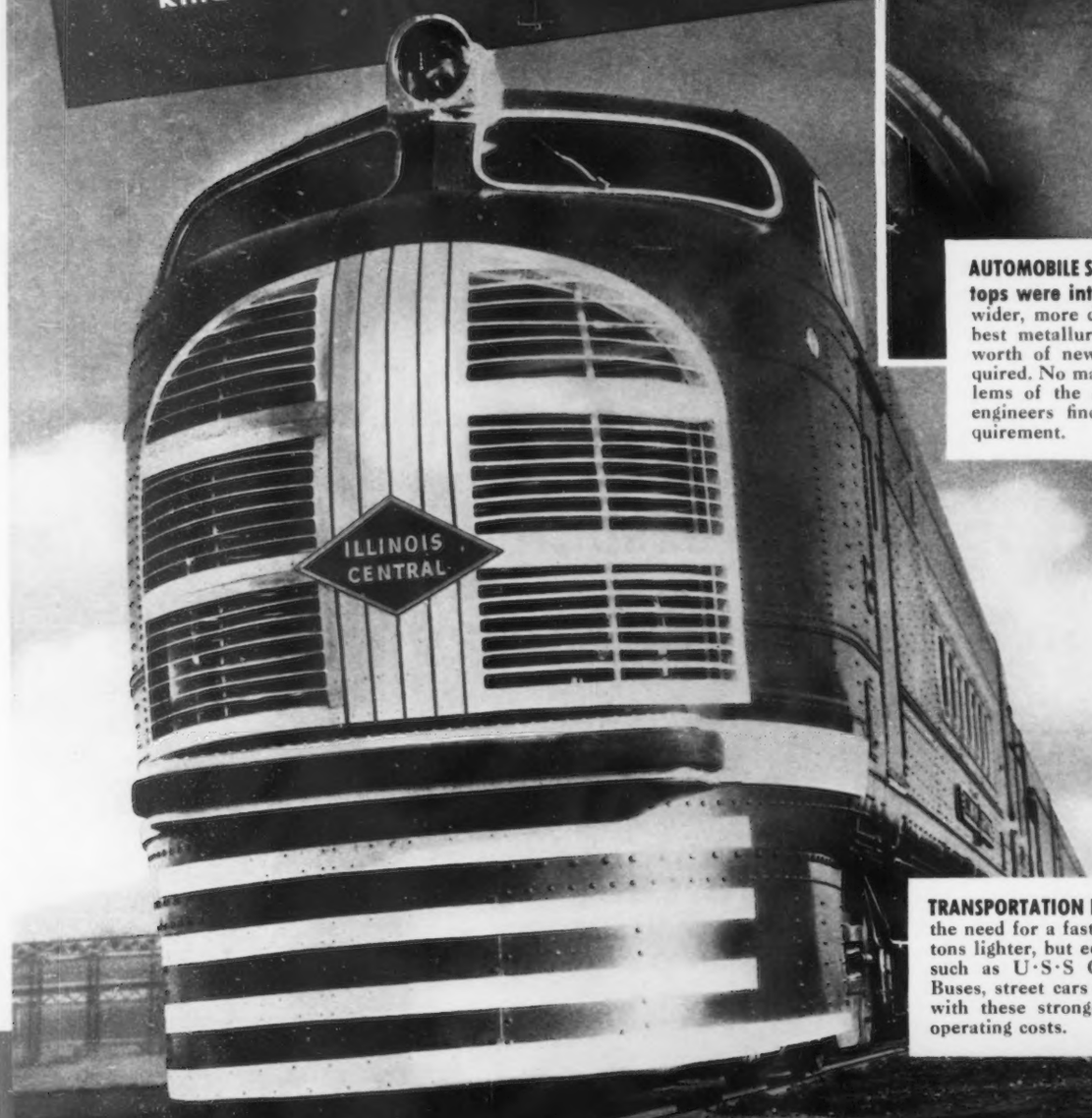
January 6, 1938

STEEL

MOTHER OF MODERN INDUSTRY

Supplies improved U·S·S Steel Sheets of every kind to meet the most exacting requirements

AUTOMOBILE SALES SPURTED when one-piece steel tops were introduced. But to make steel sheets wider, more ductile and with superior finish the best metallurgical skill and millions of dollars worth of new rolling mill equipment were required. No matter how impossible the steel problems of the automobile industry seem, U·S·S engineers find a way to meet every steel requirement.



TRANSPORTATION EQUIPMENT goes modern — meets the need for a faster pace with streamlined trains built tons lighter, but equally strong, with high tensile steels such as U·S·S COR-TEN, MAN-TEN and STAINLESS. Buses, street cars and trucks built 20% to 40% lighter with these stronger steels haul more payload — cut operating costs.

UNITED

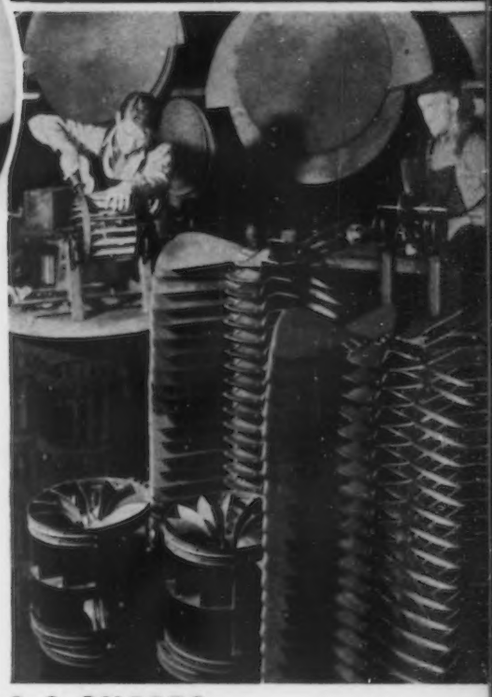
LIGHT STAMPINGS demand steel sheets that are tough and ductile —for profit depends on turning out a maximum number of perfect units. This toy soldier manufacturer discovered that the increased workability of U·S·S Sheets resulted in faster production, fewer rejects—more earnings.

BUILDING REVIVAL calls for better steel sheets and opens new markets for sheet metal fabricators. Specialists in U·S·S Stainless Steels are doing a thriving business installing stainless kitchens, stainless trim for office buildings, store fronts and elevator doors. For industrial roofing and siding and sheet metal work for homes, U·S·S Galvanized Copper Steel is ideal because its resistance to rust is more than twice that of mild steel.

HOUSEHOLD APPLIANCES reach new sales peaks. Thanks to improvements in the stamping and finishing qualities of enameling sheets, tremendous progress has been made in providing more lasting, more beautiful, more varied equipment. U·S·S Enameling Sheets owe their wide acceptance to their ability to withstand deep draws and intense heat without cracking or warping. One manufacturer reports an average of 99 perfect draws out of 100.

ELECTRICAL MANUFACTURERS build better and more economically with U·S·S Electrical Sheets. In motors, generators and transformers, these sheets increase efficiency. They punch easily without burrs, stack firmly, result in good service and longer life for rotary equipment.

AIR CONDITIONING becomes a growing giant. Its thousands of miles of ducts call for U·S·S Copper Steel Galvanized Sheets —best because of their higher resistance to corrosion. Copper Steel costs little more than mild steel but is unsurpassed for fans, housings, and ducts that must withstand constant attacks of humidity.



SPECIAL U·S·S SHEETS

COPPER STEEL—Double resistance to corrosion.

COR-TEN—High-Tensile, Corrosion-Resisting Steel.

MAN-TEN—High-Tensile, Abrasion-Resisting Steel.

STAINLESS—Silvery, long-lasting, high-tensile steel that withstands rust.

AUTOMOBILE SHEETS—Stronger, smoother, more ductile, in widths up to 100 inches.

ENAMELING SHEETS—High ductility and resistance to abnormal temperatures.

ELECTRICAL SHEETS — Extremely flat, with low electrical losses.

METAL FURNITURE SHEETS—Cold rolled, flatter, more ductile.

GALVANIZED SHEETS — Correctly coated, increased corrosion resistance.

U·S·S BLACK *and* GALVANIZED SHEETS

CARNEGIE-ILLINOIS STEEL CORPORATION, *Pittsburgh and Chicago*
COLUMBIA STEEL COMPANY, *San Francisco*
TENNESSEE COAL, IRON & RAILROAD COMPANY, *Birmingham*

Columbia Steel Company, San Francisco, *Pacific Coast Distributors* · United States Steel Products Company, New York, *Export Distributors*

STATES STEEL

USS

High levels of illumination are produced economically in this machine shop with General Electric Type-H Mercury Lamps

SEEING IS MADE EASIER... More Productive...With Mercury Light

Higher levels of illumination at a lower cost per foot-candle are assured by these modern, efficient light sources. They are promoting more efficient and more economical production in all branches of industry. The higher levels of illumination make the mere physical act of "seeing" easier... eye-strain is reduced... and more uniform high quality production is assured.

Modern industry is buying light as a production "tool." It is a sound approach to lighting because light directly affects the efficiency of all men and machines. Blended with incandescent light these mercury lamps produce illumination which simulates and blends well with daylight. Get the full story about engineered lighting and what it can do for you. Complete details are available on request from either address.

The 400-watt Mercury Lamp is 60 to 140 per cent more efficient than other available light sources. It burns vertically only.

By combining Mercury and Incandescent Lamps in many conventional type luminaires a psychologically cool, white light can be obtained.

GENERAL ELECTRIC

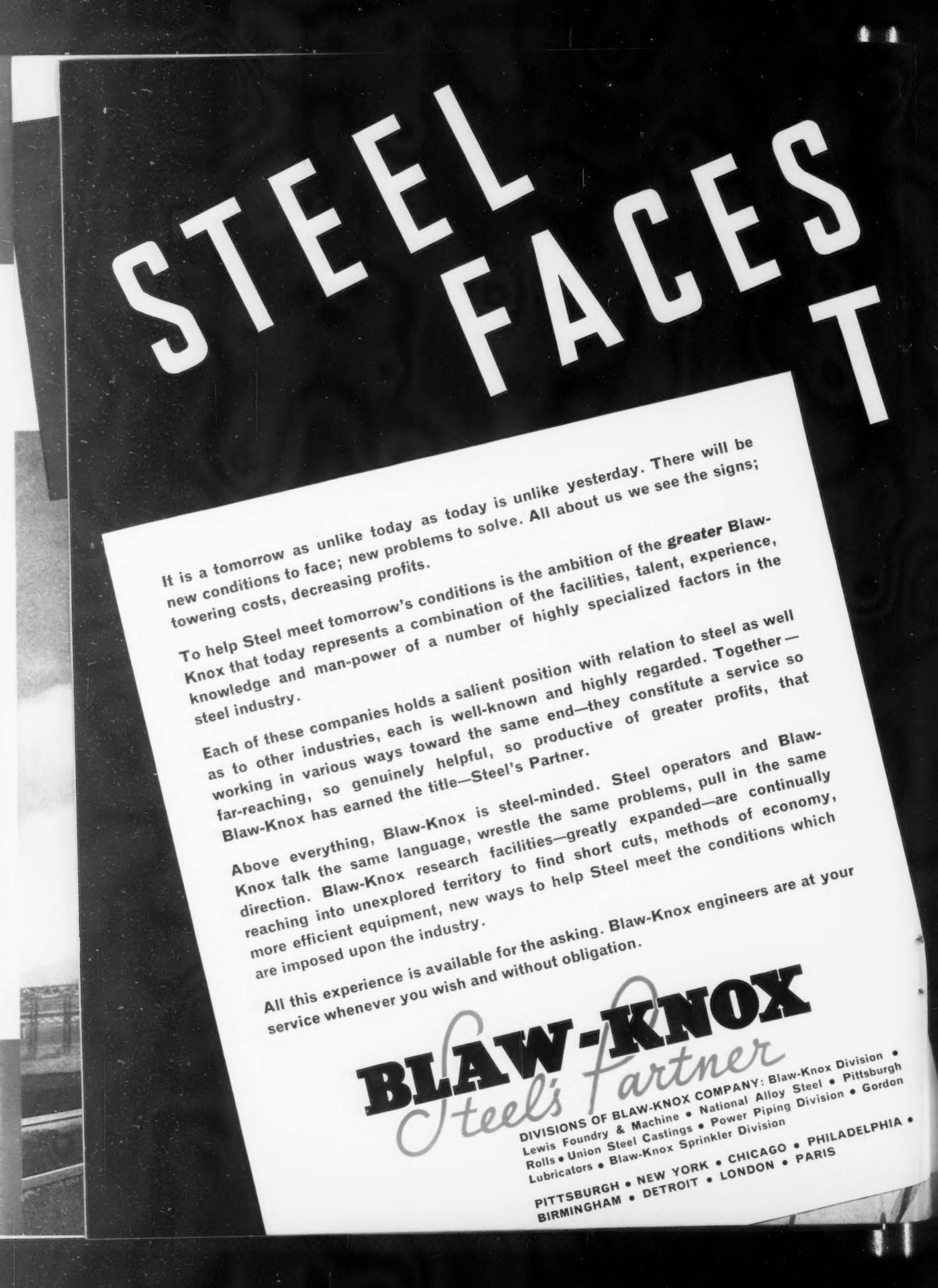
853H

General Electric Vapor Lamp Co.
833 Adams Street, Hoboken, N. J.

Incandescent Lamp Department
Dept. 165, Nela Park, Cleveland, Ohio

Order your auxiliary devices which were designed especially for this lamp from the General Electric Vapor Lamp Company.

WHAT'S AHEAD FOR 1938?



It is a tomorrow as unlike today as today is unlike yesterday. There will be new conditions to face; new problems to solve. All about us we see the signs; towering costs, decreasing profits.

To help Steel meet tomorrow's conditions is the ambition of the **greater** Blaw-Knox that today represents a combination of the facilities, talent, experience, knowledge and man-power of a number of highly specialized factors in the steel industry.

Each of these companies holds a salient position with relation to steel as well as to other industries, each is well-known and highly regarded. Together—working in various ways toward the same end—they constitute a service so far-reaching, so genuinely helpful, so productive of greater profits, that Blaw-Knox has earned the title—Steel's Partner.

Above everything, Blaw-Knox is steel-minded. Steel operators and Blaw-Knox talk the same language, wrestle the same problems, pull in the same direction. Blaw-Knox research facilities—greatly expanded—are continually reaching into unexplored territory to find short cuts, methods of economy, more efficient equipment, new ways to help Steel meet the conditions which are imposed upon the industry.

All this experience is available for the asking. Blaw-Knox engineers are at your service whenever you wish and without obligation.

BLAW-KNOX
Steel's Partner

DIVISIONS OF BLAW-KNOX COMPANY: Blaw-Knox Division • Lewis Foundry & Machine • National Alloy Steel • Pittsburgh Rolls • Union Steel Castings • Power Piping Division • Gordon Lubricators • Blaw-Knox Sprinkler Division

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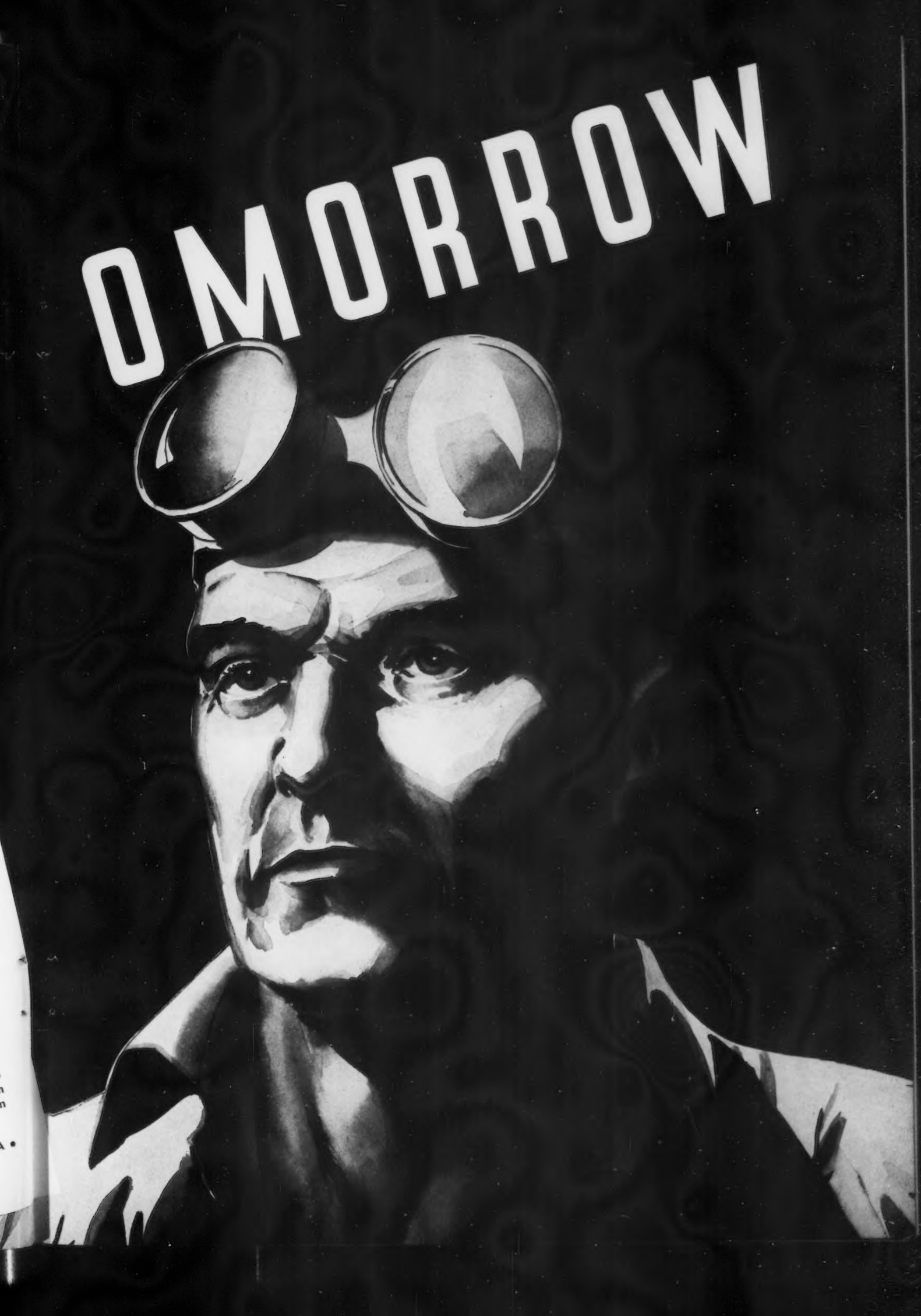
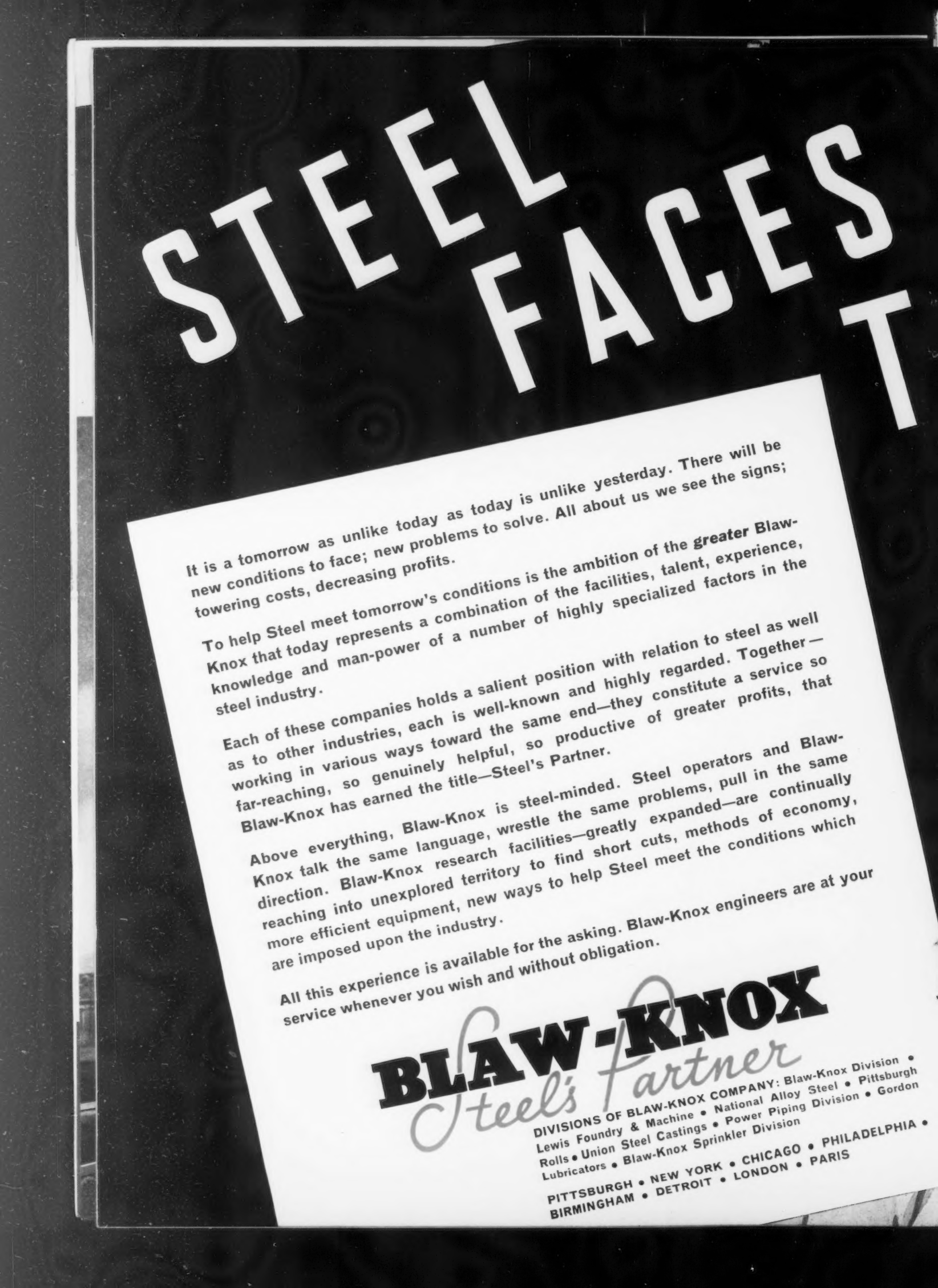

OMORROW



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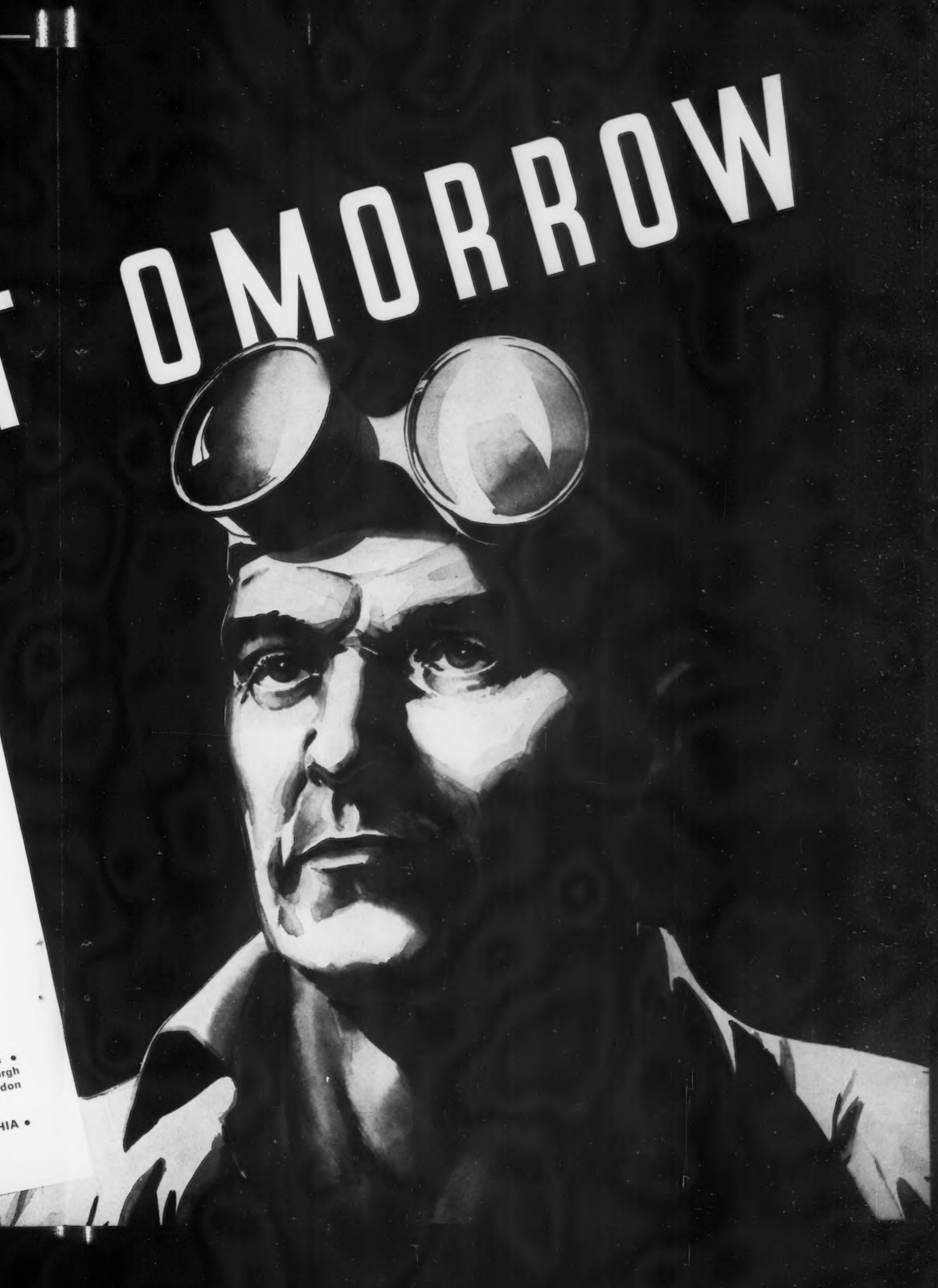

T OMORROW

BLAW-KNOX

Service to Steel

PARTIAL LIST OF PRODUCTS

BLAW-KNOX DIVISION
OF BLAW-KNOX COMPANY

Water cooled doors and frames, valves, ports, slag line coolers, bulkhead coolers, burner coolers, mantel coolers, buckstays, preheaters, dolomite machines, sloping backwalls, Venturi furnaces, single motor door hoists, annealing boxes, covers and pots, galvanizing kettles, etc., clamshell buckets, steel grating and treads, standard buildings, steam purifiers, gas cleaners, etc.

LEWIS FOUNDRY & MACHINE
A DIVISION OF BLAW-KNOX COMPANY

Chilled iron and iron alloy rolls for iron, steel, brass, copper, aluminum, zinc and nickel, hot sheets, cold sheets, tin plate and strip, merchant bars and rods, special machinery for the rolling mill industry.

Mill drives, three high mills, continuous bar and billet mills, cold mills for sheet and strip, shape straightener machines, motor operated screwdown for mills, gear sets, plate levelers, rail breakers, rail re-rolling mills, universal mill spindles, shears of all varieties, testing machines.

UNION STEEL CASTINGS
A DIVISION OF BLAW-KNOX COMPANY

Spindles, coupling boxes and other steel mill castings of UNIVAN "C" to insure great strength and exceptional wearing qualities. Charging boxes made of tough UNIVAN alloy have longer life because of unusually high impact value.

PITTSBURGH ROLLS
A DIVISION OF BLAW-KNOX COMPANY

PHOENIX ROLLS: Phoenix steel for unusual strength, Phoenix "A" (steel alloy) for strength and wear; Phoenix metal—Phoenix "K" for strength, wear, and finish, Phoenixloy (uniformly hard) for flat rolling where high finish of extremely thin gage of material is required to be free from all marks and defects; also tube mill rolls of quality material best suited to the kind of service required. Phoenix Chill—Phoenix nickel chill for all flat rolling requiring finish.

NATIONAL ALLOY STEEL
A DIVISION OF BLAW-KNOX COMPANY

Special alloy castings for service under severe conditions, creating savings in operations especially with regard to problems involving high temperature, corrosion and abrasion.

POWER PIPING DIVISION
OF BLAW-KNOX COMPANY

Pipe systems prefabricated and erected. Prefabrication guarantees greater dimensional accuracies of sub-assemblies, few field joints to be tested, freedom from shutdown due to failure.

BLAW-KNOX SPRINKLER DIVISION
OF BLAW-KNOX COMPANY

Automatic sprinkler systems guaranteed to meet all insurance requirements.

GORDON LUBRICATORS
A DIVISION OF BLAW-KNOX COMPANY

Grease lubricating systems for heavy machinery. Automatic and mechanical control.

BLAW-KNOX

Steel's Partner

DIVISIONS OF BLAW-KNOX COMPANY—Blaw-Knox Division, Blawnox, Pa. • Lewis Foundry & Machine, Pittsburgh, Pa. • National Alloy Steel, Blawnox, Pa. • Pittsburgh Rolls, Pittsburgh, Pa. • Union Steel Castings, Pittsburgh, Pa. • Power Piping Division, Pittsburgh, Pa. • Gordon Lubricators, Blawnox, Pa. • Blaw-Knox Sprinkler Division, Pittsburgh, Pa.

PITTSBURGH-NEW YORK-CHICAGO-PHILADELPHIA-BIRMINGHAM-DETROIT-LONDON-PARIS

Whitey Sez:

"In bones, it's the combined numbers that make a 'natural'... In welding, 'naturals' are a combination of good metals and welding rods of known analyses."

MAURATH, INC., CLEVELAND

BUILDER OF BETTER WELDING ELECTRODES IN ALL ANALYSES

Parts of the bicycle your father or grandfather rode in the gay nineties were doubtless made from Union Free Cut. Today, this dependable screw steel, representing more than forty years of improvement, serves important functions in the streamlined motor car, domestic appliances and business and production machines that are a part of your everyday life. Then, as now, it was the recognized standard of quality among S. A. E. 1112 Bessemer Screw Steels.

Ever uniform in analysis and highly developed machining qualities, Union Free Cut has been the faithful ally of profit and production for almost half a century. It is "easy" on cutting tools and machines at consistently low cost to accurate clean-cut detail and bright, smooth finish that assure complete satisfaction all along the line.

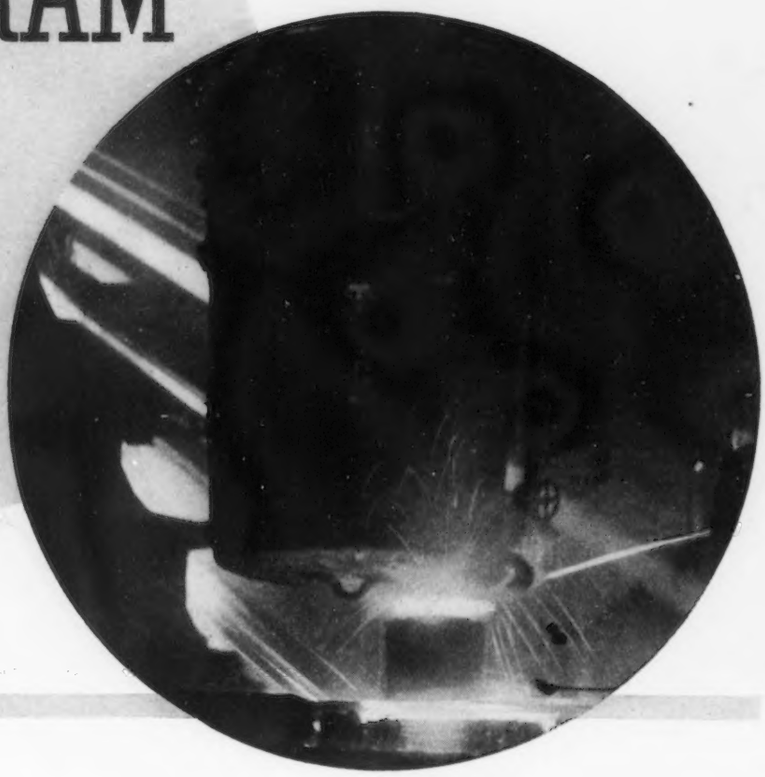
UNION DRAWN STEEL DIVISION
REPUBLIC STEEL CORPORATION
MASSILLON, OHIO

REPUBLIC STEEL

Union

Cold Drawn Steels

VANCORAM FERRO ALLOYS



FERRO-VANADIUM
Open Hearth, Electric and Crucible Grades

FERRO-SILICON
15%, 50%, 75%, 80-90%, 90-95%

FERRO-TITANIUM
High, Medium and Low Carbon Grades

FERRO-CHROMIUM
High Carbon Grade (4 to 6% carbon).
Low Carbon Grades (from maximum .06% carbon to maximum 2% carbon).
Special Iron Foundry Grade

ALSIFER
The Ferro-Silicon-Aluminum Deoxidizer Without a Disadvantage.

CHROMIUM METAL

•

These grades of Vancoram Brand Ferro-Chromium are carried in stock and supplied as required in large lumps, or crushed or ground to various sizes. Write for complete information.

VANADIUM CORPORATION OF AMERICA
420 LEXINGTON AVENUE, NEW YORK, N. Y.
Plants at Bridgeville, Pa., and Niagara Falls, N. Y.
Research and Development Laboratories, Bridgeville, Pa.

VANADIUM STEELS

METALS VANCORAM ALLOYS

FOR STRENGTH • TOUGHNESS • DURABILITY

"Where's all your stock of lubes?"

"*That's all we need since they made that* LUBRICATION SURVEY!"

STANORUST TAKES ALL GUESS-WORK OUT OF RUST PREVENTION

A scientifically developed rust preventive will prove to be the cheapest weapon against corrosion losses when the cost of application and removal, plus the actual protection provided, is considered.

STANORUST

—does not crack, chip or peel, and gives maximum protection over longer periods of time

—is easily removed when necessary

—can be applied by spraying or dipping, as conditions demand

—is clear, odorless, and will not cause skin irritations.

Because you get *all* these features in one product, Stanorust meets *every* condition where control of corrosion is a problem. Your local Standard Lubrication Engineer will help you choose the correct grades for your service.

A THOROUGH, scientific examination of your lubrication requirements by a Standard Lubrication Engineer will show *many* ways in which you can save money, particularly on your stock of lubricants.

Complicated lubricant stocks are hard to handle and dispense, and confusing to stock clerks and oilers alike. As a result of this confusion, lubrication recommendations are frequently ignored, definitely contributing to higher maintenance and lubricating costs.

A lubrication survey in your plant may show many instances in which one lubricant can replace three or four brands now carried. The saving this means is evident: reduced stock, less waste, less handling and lubricating time, and above all, full assurance of the right lubricant for every job.

Call the Lubrication Engineer at your local Standard Oil (Indiana) office. Let him tell you *how* a lubrication survey can bring about further cost reduction in your own plant. There's no obligation. Make an appointment with him today.

THE RIGHT LUBRICANT • PROPERLY APPLIED • TO REDUCE COSTS

STANDARD OIL COMPANY (INDIANA)

LUBRICATION ENGINEERING

Modern complexities of manufacture have placed even more exacting demands on

HARDENED AND GROUND ROLLS

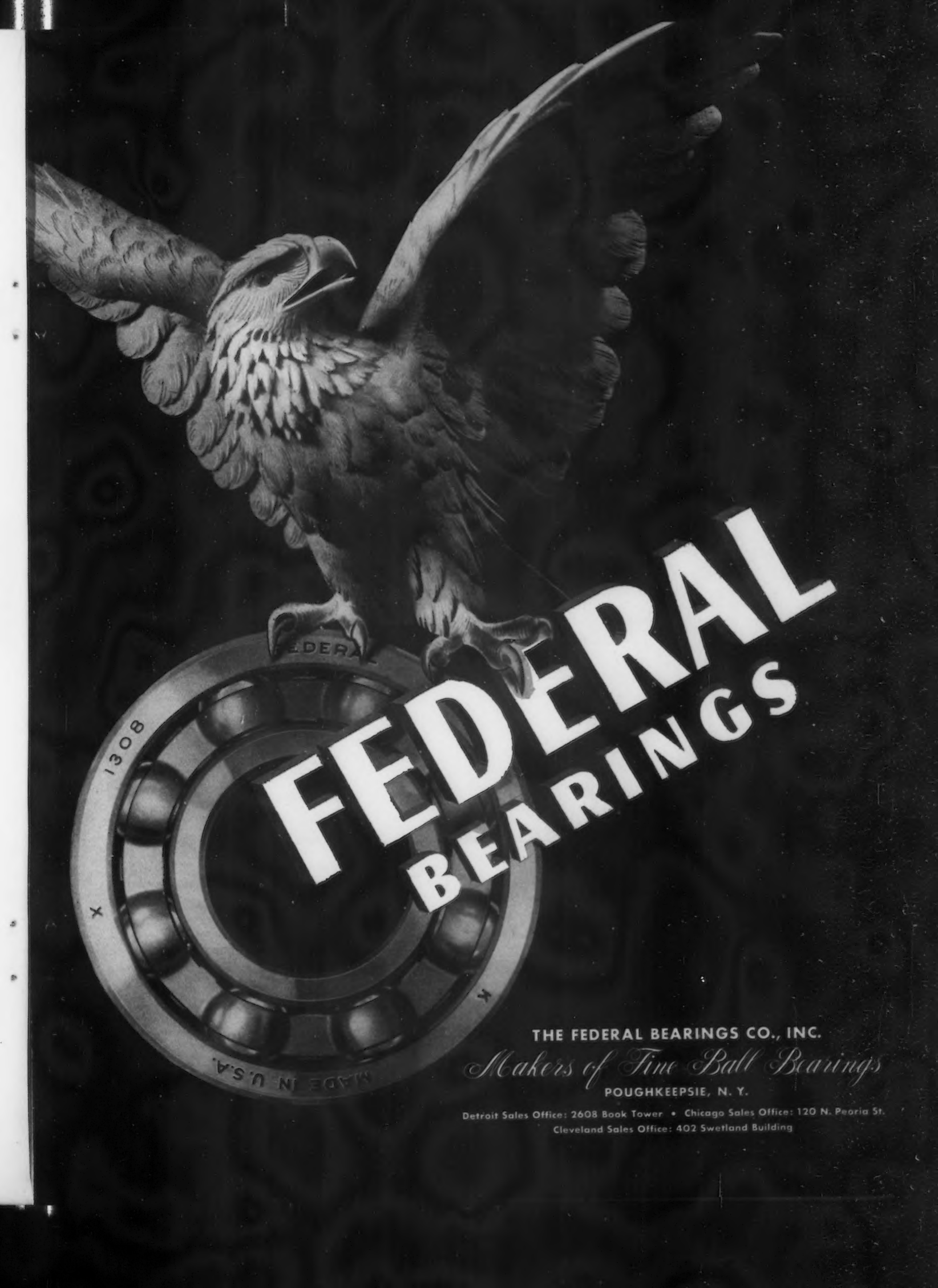
Rods, strips and sheets today may run all the way from low carbon steel to alloys of unusual toughness or hardness. Rolls for a given purpose may prove entirely inadequate for new demands.

We have solved for many different types of industry varied roll requirements. It is no accident that Midvale hardened and ground rolls have earned a reputation for satisfactory service and long life, in many industries.

THE MIDVALE COMPANY • NICETOWN • PHILADELPHIA

OFFICES: *New York • Chicago • Pittsburgh • Washington • Cleveland • San Francisco*

MIDVALE



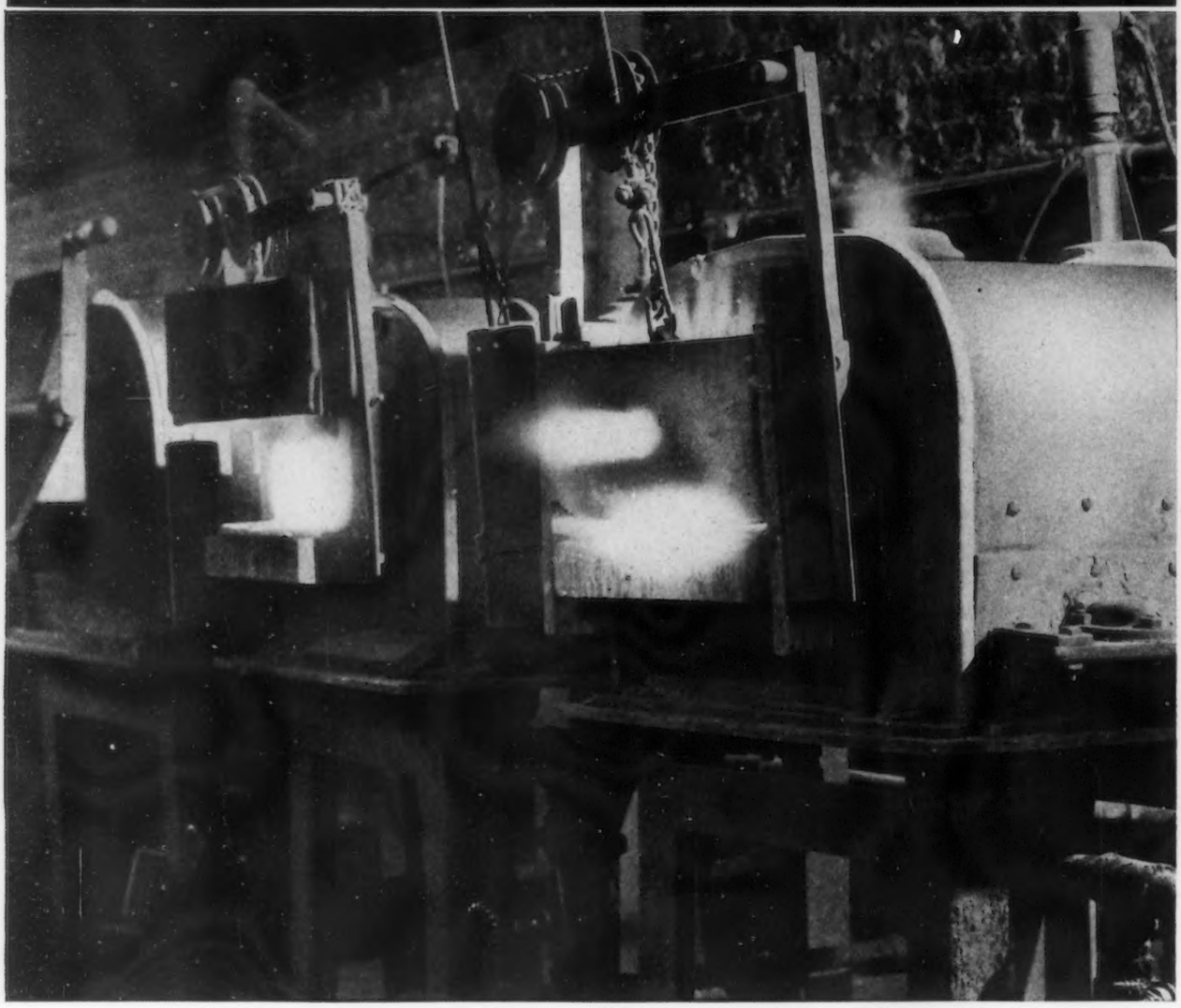
THE FEDERAL BEARINGS CO., INC.

Makers of Fine Ball Bearings

POUGHKEEPSIE, N. Y.

Detroit Sales Office: 2608 Book Tower • Chicago Sales Office: 120 N. Peoria St.
Cleveland Sales Office: 402 Swetland Building

Nothing but "Carbofrax" for this heat treating shop



THIS outstanding tool manufacturer's heat treating shop has standardized on "Carbofrax" hearths for the following reasons:

1. Long life **2.** Definite fuel savings **3.** Faster furnace operation

In the high speed furnace on the right, "Carbofrax" hearths give an average life of eighteen months.

The "Carbofrax" hearths in the other two furnaces, used for lower temperature work, give an average life of two and one-half years.

The list of heat treating shops that have standardized on "Carbofrax" is growing. We can show savings in your shop too. Let our sales engineers survey your furnaces and make recommendations.

REFRACTORY
CARBORUNDUM
PRODUCTS

Tune in the Carborundum Band Saturdays at 7:30 P. M., E. S. T., Columbia Chain

THE CARBORUNDUM COMPANY, REFRACTORY DIVISION, PERTH AMBOY, N. J.

District Sales Branches: Chicago, Philadelphia, Detroit, Cleveland, Boston, Pittsburgh. Agents: McConnell Sales and Engineering Corp., Birmingham, Ala.; Christy Fire Brick Company, St. Louis; Harrison & Company, Salt Lake City, Utah; Pacific Abrasive Supply Co., Los Angeles, San Francisco, Seattle; Denver Fireclay Co., El Paso, Texas.

(Carborundum and Carbofrax are registered trade-marks of The Carborundum Company)

Like Making Your Own Steel In Your Own Plant

Here's the answer to today's more difficult forming problems and increased machine speeds so necessary to low manufacturing costs:

Bring the blast furnace, the open hearth, the hot mills, cold mills, annealing furnaces into closer step with the various operations and finishing process in your own plant.

Example after example from the daily experiences of Inland field men and metallurgists prove the need of this closer teamwork between steelmaker and steel user.

Inland's teamwork with customers has developed to an unusual degree of practical effectiveness. It includes not only a field man or metallurgist willing to spend time in your plant . . . but also quick response from mill officials able to follow through.

Inland's well co-ordinated organization in effect becomes a department of your own production facilities—vitally interested in the success of your business.

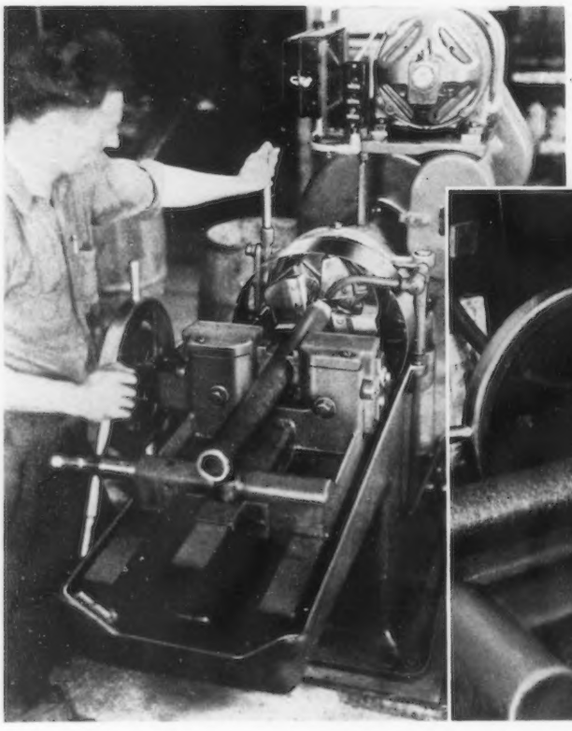
You can use this Inland teamwork profitably.

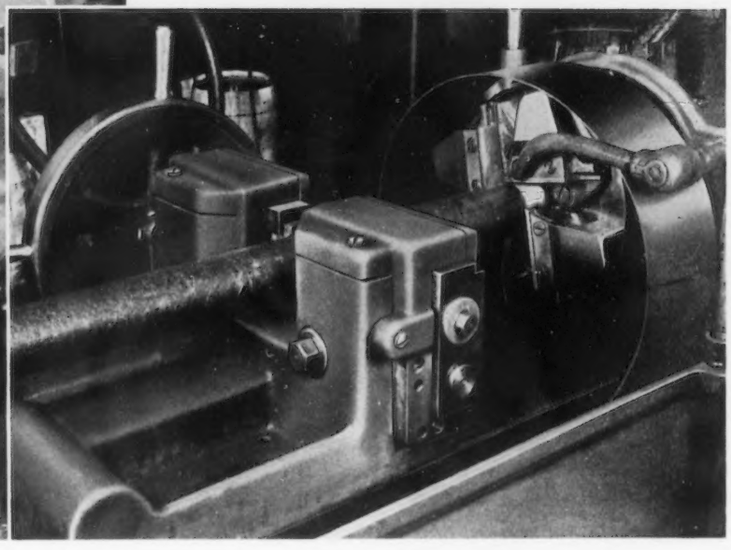
SHEETS STRIP TIN PLATE BARS RAILS TRACK ACCESSORIES PLATES FLOOR PLATES STRUCTURALS PILING REINFORCING BARS

INLAND STEEL CO.

General Offices: 38 South Dearborn Street, Chicago, Illinois • Offices in: Detroit · Kansas City · Milwaukee · St. Louis · St. Paul

The *NEW* LANDIS STANDARD THREADING MACHINE goes to work on an *Economy* BASIS





The new LANDIS Standard Threading Machine as illustrated above in the plant of one of the larger manufacturers of oil field tubular products, is the *ideal* machine for economy in threading operations.

The LANDIS Standard Machine is Economical because it is a thoroughly modernized machine that may be installed at a lower *first cost*. This lower first cost, plus the savings that are effected by using the LANDIS patented Tangential Chaser, establish a basis of economy for threading operations that no manufacturer can justly ignore.

May we send you more complete details?

LANDIS MACHINE CO., Inc.

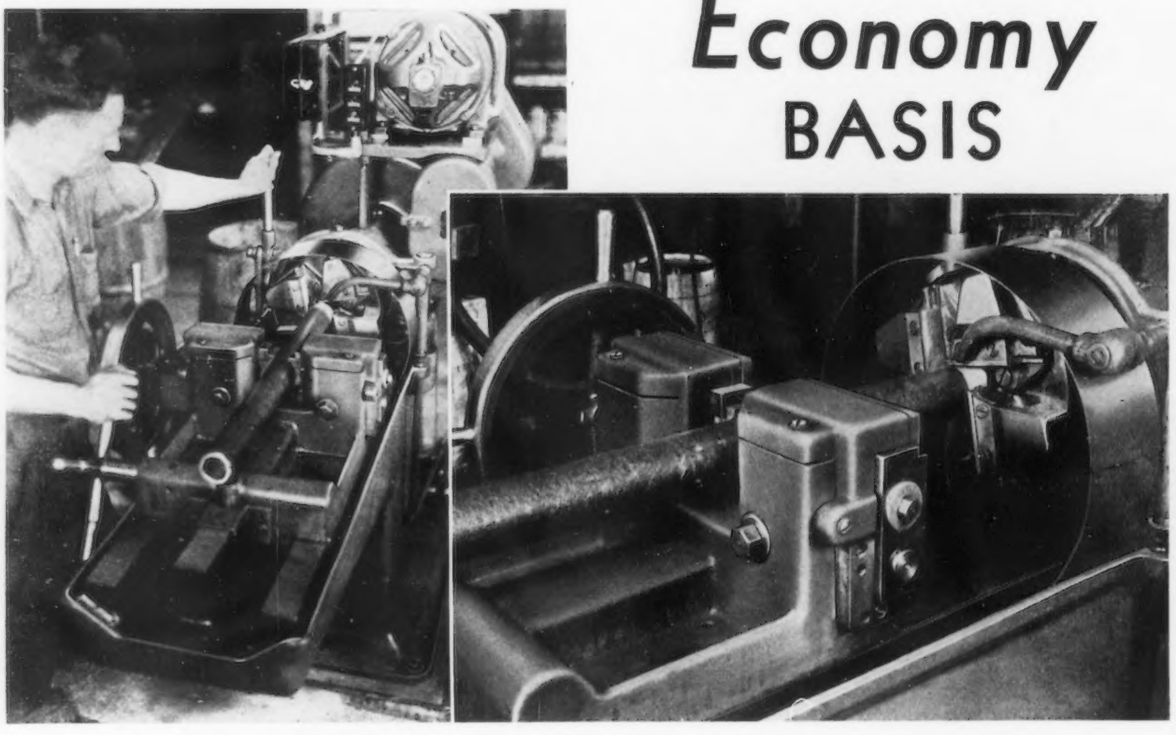
Waynesboro, Penna.

THE IRON AGE

Contents

DECEMBER 2, 1937

The *NEW* LANDIS STANDARD THREADING MACHINE goes to work on an *Economy* BASIS



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THE IRON AGE

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DECEMBER 2, 1937

Why VisControlled steels *are better for forging*

FORGINGS demand, above all else, good surface and a sound interior—both dependent to a large degree on how the steel was made. Each of these qualities is outstanding in VisControlled steels. For this reason:

Both surface and soundness of steel are influenced by deoxidation of the molten steel at the end of the open-hearth heat. On the one hand, good surface requires that sufficient deoxidizing addition be used to overcome oxidation. On the other hand, excessive additions are likely to produce an unsound or dirty steel.

With the VisControl process, developed by Bethlehem, it is possible to meet both these conditions. Oxidation in the open-hearth is held to lowest practicable limits—and held within a narrow, well-defined range. As a result, deoxidizing additions are kept low—ideal for sound, clean steel. Yet deoxidation is complete—ideal for good surface.

Practically all Bethlehem steels are now produced under this exclusive VisControl process. Try this steel—see if you don't find, as others have found, a marked improvement in quality of forgings.

BETHLEHEM STEEL COMPANY

BETHLEHEM STEEL

▲▲▲ THE IRON AGE ▲▲▲

December 2, 1937

ESTABLISHED 1855 Vol. 140, No. 23

Congress Will Listen to Labor

INDUSTRIAL shut-downs are harmful to everybody. The investor suffers because dividends shrink or vanish. Government suffers because taxes dwindle. The butcher, the baker, and other tradesmen suffer because buyers' incomes are reduced. But the people who suffer the most are the men and women workers who lose their jobs or, at best, go on part time.

That is what is happening today all over this country. Not a very cheerful outlook at the time we should be getting ready to wish each other a "Merry Christmas and a Happy New Year."

There are a number of reasons for this decline in activity, but the biggest one of them all is the Corporate Surplus Tax Act. It prevents money from flowing into industry to create employment, because it puts a drastic penalty on the plowing back of profits to build new plants or new industries and thus to make new jobs. It is supposed to force profits to be distributed as dividends. Theoretically, it is a "class" Act, favoring the investor at the expense of labor. In its practical working, judging by the stock market, the sole beneficiary of the act is the man who sells stocks "short."

Millions of American workers are now being thrown out of work or put on short time because of the working of this Act. They will continue to suffer in this way until the Act is repealed. It is not enough to simply modify it. The principle is wrong. While that principle exists, people with money to invest will feel it is more secure in a tin can buried in the backyard than put into industry.

The outright repeal of this Act at this session of Congress is imperative, if we are to see a revival of business before next fall. If it is not repealed at this session, action cannot be taken upon it until the last of January or the first part of February next. That will be too late, because the boards of American corporations will have met, early in January, to make plans for the ensuing year. If the Act has been repealed before they meet, the plans will be for expansion in anticipation of an upswing in business. If they meet with the Act unrepealed, the plans will be for further curtailment.

The Corporate Surplus Tax Act is **not** a labor bill. It was not initiated or supported by labor. And its disastrous effects are now bearing more heavily upon men and women who work for wages than upon any other class of Americans.

If the men and women of America who work for wages will appeal to their Congressmen now, to remove from their necks **now,** the octopus tax Act that is strangling their jobs **now,** the Act will be repealed **now.** And if they do this without delay, we can all look forward to a happier Christmas in the expectation of a more prosperous New Year.

J. H. VanDeventer

Norfolk & Western's Smith Shop Layout, Modern Equipment and

By FRANK J. OLIVER
Associate Editor, THE IRON AGE

o o o

WHEN one thinks of a forge shop or a "smith shop," as the railroads call them, the average shop man is more than likely to visualize a maze of rusty machinery and conglomerate masses of material indiscriminately piled, between which he would have to pick his way in a sort of dim, religious light over rough and uneven terrain that could hardly be termed a floor. An occasional ray of sunlight would penetrate the gloom, coming through the partially opened and pivoted windows in the monitor roof, and through which the ubiquitous smoke was vented. The "lights" in the sash would be covered with the soot of ages left there with the idea that the men could better see the "heats" in semi-darkness. Besides, under such lighting conditions, the filth and litter, the general disorder and the hills and valleys in the floor were less obvious.

The smith shop of the Norfolk and Western Railway at Roanoke, Va., stands out in marked contrast to the not-exaggerated description of the typical forge shop given above. Light has been shed both literally and figuratively on an often neglected phase of metal working operations, and careful planning and layout of the thoroughly modern equipment have produced one of the outstanding examples of its kind in this country, be it in the railroad field, notoriously backward in its shop methods, or in the vanguard with the automotive industry. Although the major change that brought about this prime result occurred six years ago, the introduction of a number of innovations since then and the fact that a description of this development has not heretofore appeared in the technical press warrants a description of the shop at this time.

The layout illustrated is not the result of hasty planning. For years the superintendent of motive power has cherished the thought of an ideal forge shop layout, one that would answer all needs for years to come and would represent a real step forward. Together with the smith shop superintendent, he played around with cardboard cut-outs on a scaled floor plan, and not

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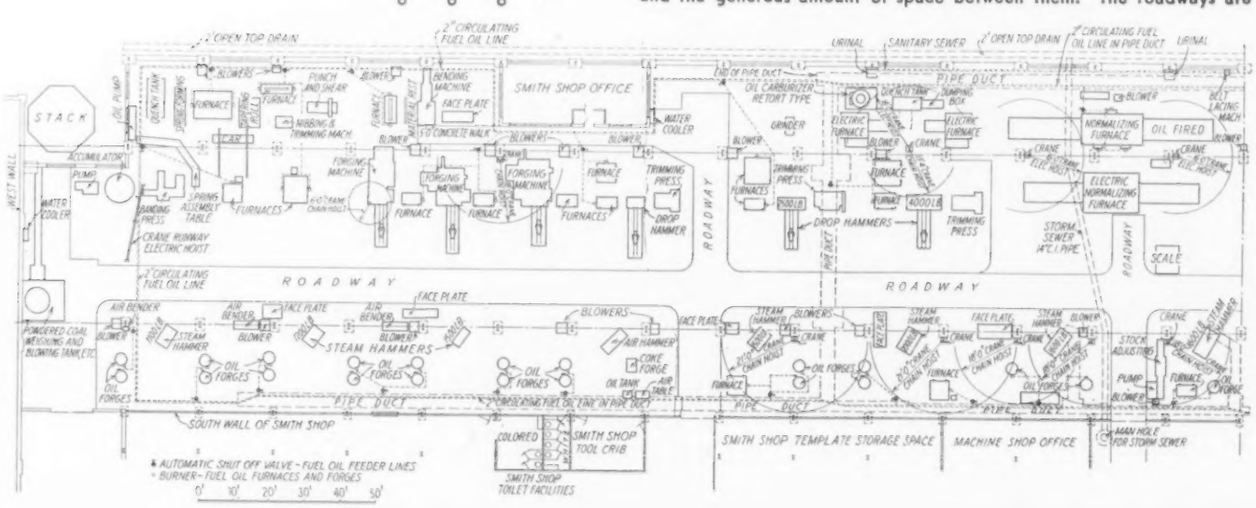
FLOOR plan layout of the smith (forge) shop of the Norfolk & Western and the generous amount of space between them. The roadways are



Is a Shining Example of Good Excellent Working Conditions

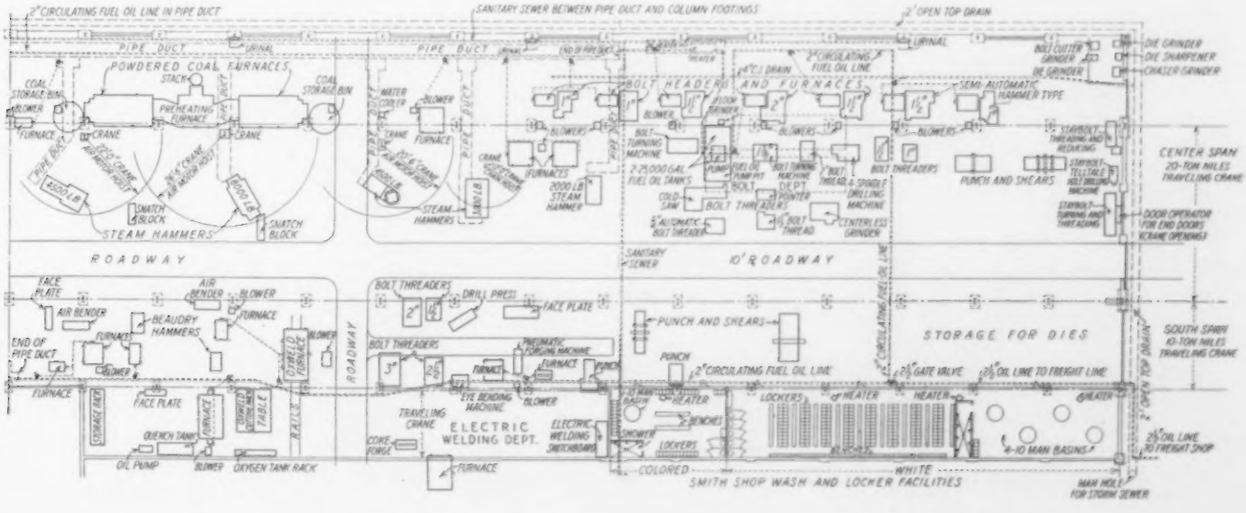
a single move of actual machinery was made until everyone concerned was satisfied that the new scheme of things as finally revised was the real answer to the problem of layout.

The question of proper lighting, ventilation, provision for shop services and material handling facilities was solved at a stroke by the erection of a new building. This was accomplished, incidentally, while production was being maintained and the old structure was progressively being torn down. The result can be seen in the accompanying photographs and in the floor plan layout. The first thing that strikes attention is the natural lighting. The entire north wall, half the south wall and the monitor roof section are practically all glass, mounted in steel sash. What little brick work there is and all the steel columns and supports above the 5-ft. brown base line are painted white. All of the furnaces are coated with aluminum paint and the machinery is colored a light neutral gray so that absorption is avoided and reflectivity is taken advantage of. No longer is the color of the metal relied upon to gage its temperature, and instead electric pyrometers, in many instances of the recording-controller type, are employed, substituting science for guesswork.

The second thing that strikes the eye of the visitor is the general neatness and cleanliness. Both objectives are achieved by a layout that provides ample space between and around the various forging units and complementary furnaces. The concrete aisles are wide for trucking and plenty of space is available for the storage of material in process close to the point at which it will be worked. This is particularly obvious in the view showing the heavy-duty upsetting machines at the northwest end of the shop. Wherever possible, similar operations and similar machines are grouped, such as is the case for the oil forges and steam hammers at the southwest end, where provision is made for both hand and power work. Similarly, all heat-treating furnaces for annealing, normalizing and carburizing are concentrated east of the shop office. It is here, incidentally, that some of the most advanced equipment is installed.

Powdered coal, fuel oil and electricity are used as the heating medium, but no smoke is visible.

Railway, illustrating the neat and orderly arrangement of machines and furnaces, concrete, surrounding gravel areas in which the equipment is spotted. o o o



Burnt gases from the coal are exhausted up a stack outside the building, and on the large oil-fired furnaces, burnt gases are exhausted through sheet metal ducts. Low pressure air pipes are located over furnace vents which serve to preheat the air for combustion.

Service Piping in Floor

Running half the length of the building on the north side just inside the column foundations is a pipe duct in which most of the service piping is concealed under the floor. Live and exhaust steam pipes and oil and water pipes are carried in a concrete duct measuring 3 by 3 ft. Besides eliminating unsightly and light obstructing overhead piping, this arrangement provides a means for warming the fuel oil and maintaining its low viscosity in cold weather. From this duct there is lead off a 2-in. circulating fuel oil line which serves the furnaces south of the main building roadway. This line is embedded under the gravel floor. For the large steam hammers, however, concrete ducts are provided for take-offs from the main steam header. There is a separate pipe duct alongside the south wall at the west end to serve the hammers in the oil forge section, and the oil circuit is routed through this duct also. This oil supply line is a loop circuit extending the entire perimeter of the building and is maintained at constant temperature and pressure.

Bars and billets are stored in the open in a yard east of the smith shop. Both the main 20-ton crane and the auxiliary 10-ton crane have extended runways that permit bringing in this material either directly to the hammers and furnaces or to the shears adjacent to the east doorway. Sheared bar stock is loaded on high skids of a height convenient for furnace charging and hammer or upsetter discharging. These skids may be moved about either by gasoline or electric industrial trucks operating on the concrete runways or by the overhead cranes with chain slings. The building design and layout is such as to provide ample room for maneuvering the former and plenty of headroom for the latter. Jib cranes with chain, electric or air hoists serve local groups of furnaces and hammers.

Except for those sections immediately adjacent to large furnaces, space heating is supplied by unit heaters of the steam coil type. Sanitary conveniences are of the best, with modern locker and wash room facilities, and separate toilets and showers for white and colored help. The cooled drinking fountains are similarly segregated. As in many other railroad shops, urinal stalls of the fresh air variety are located at convenient intervals, in this instance along the north wall.

As has been mentioned, the equipment layout is generous when it comes to space and wherever possible related or similar equipment is grouped. Starting at the east end of the shop, for example, we find first the shears in an area large enough to store large quantities of material on the floor or in skids or tote boxes. To the right and further west is the bolt department. There is a line of seven bolt headers with heating furnaces facing the aisle along the north wall. The first machine is a 1-in. National hammer header for T-bolts and the like, suitable for continuous bar feed. Two of the other machines were added in the last year: a 1½-in. National header of conventional design and a 2-in. Acme header. Directly behind the headers is a group of bolt turning and threading machines, as well as a cold saw and bolt pointer. Included in this set-up is a Cincinnati centerless grinder for grinding bolt shanks, pins and bushings on external surfaces. It is the practice on the N. & W. to grind all bolts for locomotive frame constructions, including the attachment of cast iron cylinders to cast steel frames. There is also a second group of bolt threaders across the central concrete roadway to take care of some of the larger bolts running up to 3 in. in size. Complementary equipment such as an eye bending machine, drill press and pneumatic forging machine, serves this section.

The two largest steam hammers in the shop, an 8000 and a 4500-lb

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BATTERY of oil forges and steam and air hammers, together with hand anvils, in the southwest corner of the smith shop. A 10-ton traveling crane running the length of the south wall serves this section. There is a gravel floor between the concrete roadways.

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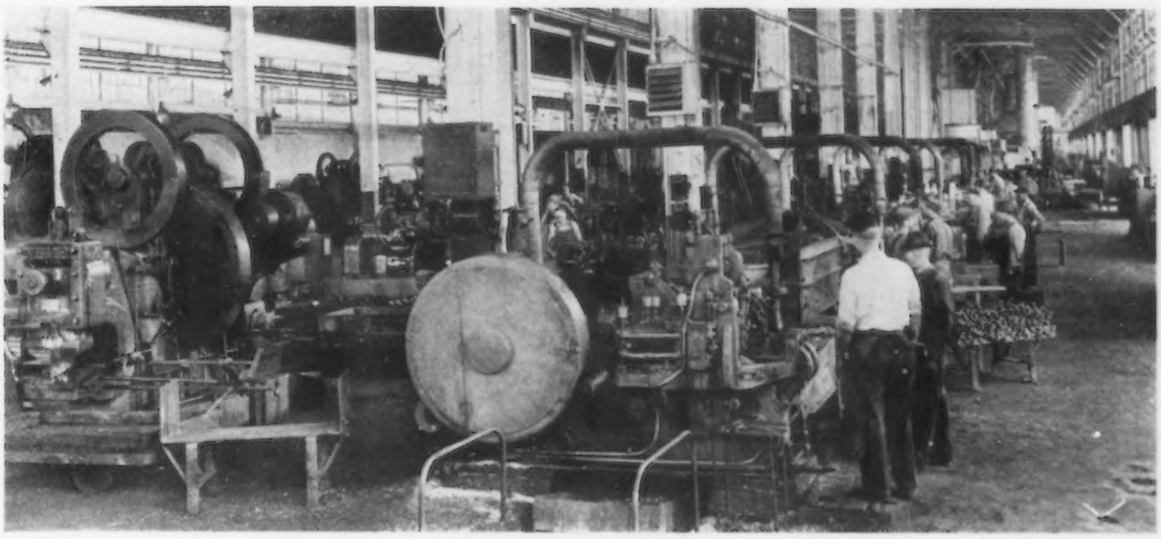

THIS 1-in. semi-automatic, hammer-type bolt header is the first unit in a line of seven bolt headers, ranging in capacity from 1 to 2 in. The inverted U-shaped pipes are low-pressure air supply lines over which the products of combustion pass preheating the air for combustion.

unit, take up bays 12 to 16 further west. They are served by a combination furnace fired by powdered coal. In this set-up powdered coal is fed from the pulverizing unit in the boiler house to a weighing and blowing tank at the west end of the smith shop from which it is distributed by a 4-in. overhead pipe to storage bins beside each furnace, one on each side of a common, preheating furnace. Products of combustion of both furnaces pass into this central zone before being exhausted up a single stack. This design provides the necessary flame length of 15 to 20 ft. required for the most efficient use of powdered fuel. An advantage of the system is that a reducing atmosphere is produced, thus practically eliminating scaling. Side and main rods,

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draw bars, guides and other heavy section parts are forged on these hammers, one a double, the other a single-frame type. Air motor hoists on 26½ and 22 ft. jib cranes serve

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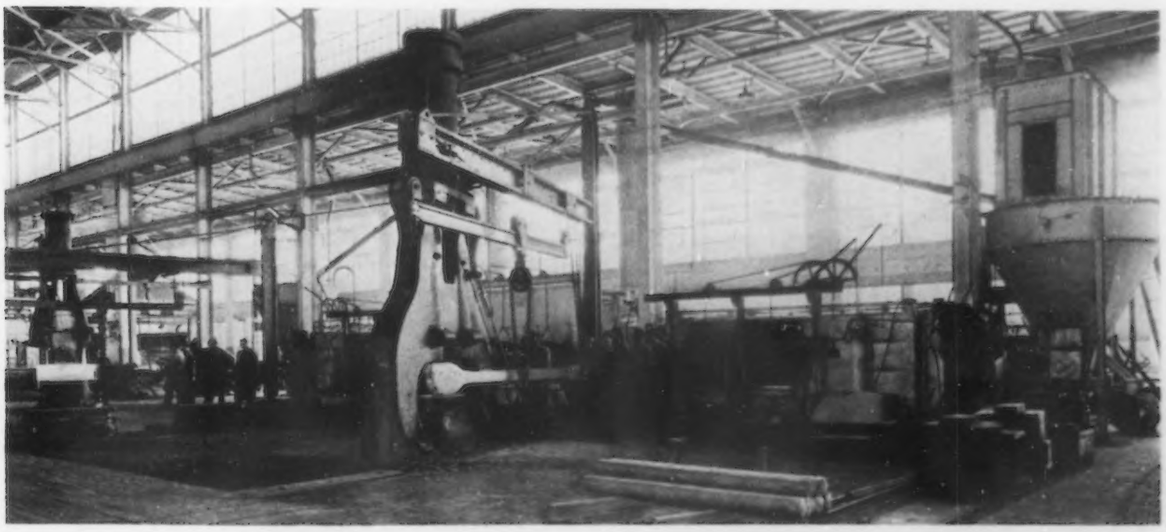
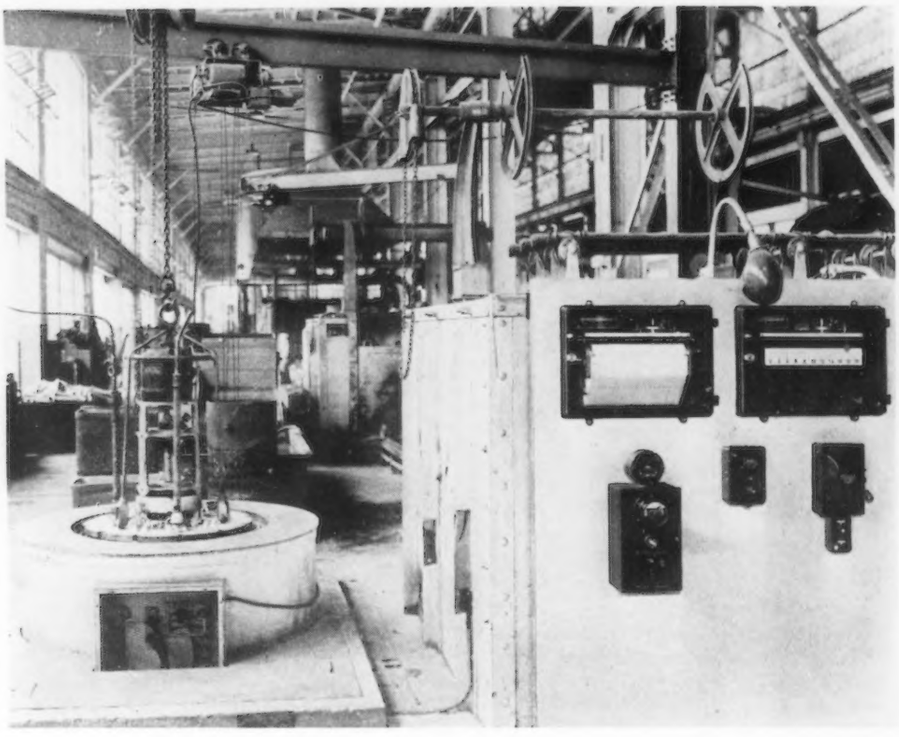
THIS 8000-lb. steam hammer, together with the 4500-lb. one seen at the left, are both served by the combination powdered coal furnaces in the background. Products of combustion of right and left-hand furnaces pass into a central, preheating furnace before passing up the stack.

each hammer, respectively, and the layout occupies four bays of 21 ft. center distance, giving plenty of room for the manipulation of long parts.

Opposite this large hammer group is a smaller 1600-lb. hammer, two Beaudry hammers and two air benders, each with its heating furnace alongside. In the same gravel section surrounded by concrete runways are an Oxweld cutting machine and an annealing furnace for stress relieving flame cut work.

Further west and also south of the main aisle is another group of six steam hammers ranging in capacity from 1100 to 2000 lb. There is also one Nazel air hammer in the group. The two larger hammers are served by oven-type heat-





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AT the left is a new Hevi-Duty Carbonol oil carburizing furnace of the retort type, sunk in the floor. Beside it is an electric furnace for pack carburizing, with dump trays and quench tank in the background. The recording instruments shown serve the Carbonol unit.

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ing ovens, while the remainder are served by open-type oil forges, set up in pairs, of which there are ten. These forges serve equally well for hand sledge work on anvils.

On the north side of the main aisle are three groups of drop hammers and trimming presses in combination with furnaces, and further west in the same machine lines are three heavy-duty upsetting type forging machines. The heat-treating division is between this group and the large steam hammers, but nearer the north wall. Last in the line and in the extreme northwest corner of the shop is the spring division, with shear, nibbing and punching machines, tapering roll, spring forming press and banding press with the necessary furnaces and quench tank.

In the heat-treating division, up-to-date facilities have been provided

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BATTERY of upsetting type forging machines with oil-fired furnaces alongside. The shop office is in the background along the north wall. Note the excellent illumination provided. A 20-ton crane runs the length of the center span.

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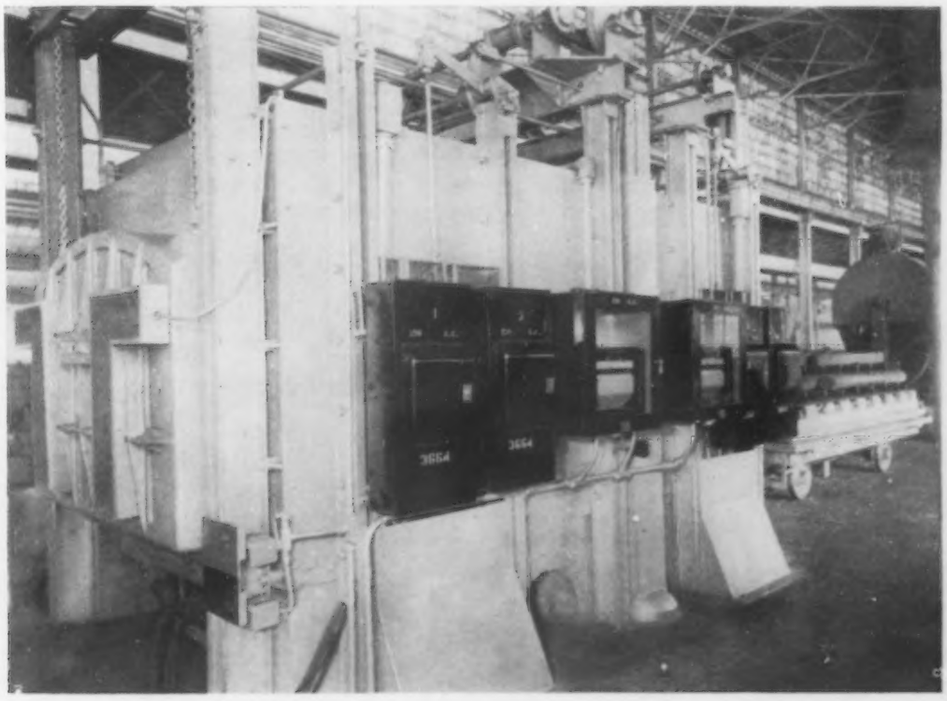
BAR stock storage bins at east end of shop.

for normalizing, hardening, drawing and carburizing. Two normalizing furnaces are provided, one oil fired, the other electrically heated and equipped with recording type temperature controls. The oil fired furnace is used chiefly for annealing of parts such as draw bars and chain which can be left in the furnace to cool. All important forgings are normalized in the Hevi-Duty electric furnace, including such parts as main and side rods, piston rods and guides.

The process is really a double normalize: The forgings are initially heated to 1600 to 1650 deg. F. and are held at the predetermined temperature ¾ hr. per in. of thickness to equalize the grain structure; they are then cooled in air to a black heat (900 deg.), are recharged just above the critical range of 1475 to 1500 deg. and are held at this temperature for 1 hr. per in., then run out and cooled to 900 deg. again. Tampering is performed at 1150 to 1175 deg. for 1½ hr. for each inch of thickness. The material is a 0.45-0.55 per cent carbon steel, and after heat-treatment the following properties are typical: Ultimate strength of approximately 90,000 lb. per sq. in., yield point of 52,000 lb., 27 per cent elongation, with 45 per cent reduction in area. The recording controller pyrometers are a recent addition and have done much to take the guesswork out of this complicated cycle.

Two methods are now available



RECORDING potentiometer type temperature controllers have recently been added to this modern electric annealing furnace to assure more positive cycle control.

for carburizing, thanks to the addition of an oil vapor type this year. Two Electric Furnace Co. roller hearth ovens are provided for carburizing pots for pack hardening. In front of them is a dump rack and quench tank as can be seen in the floor plan layout at bays 21 and 22. An 18-ft. jib crane with electric hoist is available for handling the pots in and out of the furnaces and onto the rack.

Oil Vapor Carburizer

The new Hevi-Duty Carbonol oil vapor carburizer is located in the floor alongside one of the electric furnaces. It, too, is electrically heated and has recording type potentiometer controls. Work is loaded in the vertical retort, with the aid of suitable baskets and the cover is bolted and sealed in place. The carburizing medium is in the form of oil of high hydrocarbon content, known by the trade name Carbonol. It is fed from an overhead tank through a flexible hose and sight feed oiler, which allows the liquid to enter the retort drop by drop. Inside the chamber it strikes the blades of a centrifugal fan which together with the heat vaporizes the oil and violently agitates the resulting gas so that uniform penetration of every piece, regardless of shape, is assured. Unabsorbed gas is allowed to escape through a small pipe from which it may be ignited. The color of the flame gives a gage of the amount of gas generated and the amount of carbon absorbed.

Advantages of the process, besides uniformity of case and general cleanliness of the operation, are improvement in physical qualities and less grain growth, due to the shorter time at the carburizing temperature, the possibility of quenching directly from the carburizing heat, cleanliness of the work surface due to the controlled atmosphere, and saving in floor space because of the vertical construction. The retort measures 36 in. deep by 18 in. in diameter, and the furnace is used principally for pin and bushing work. Typical treatment of large special bushings of 0.10 per cent carbon steel is as follows:

(1) Machine bushing on the inside to 1/64 in. of size and face one end; (2) carburize; (3) machine outside diameter and opposite end; (4) reheat and quench; (5) grind inside diameter; and (6) turn soft outside diameter to fit.

In this furnace, due to the turbulent effect of the fan and the nascent condition of the gas, a case of 1/16 in. can be obtained in four to five hours. This is believed to be the first installation of its kind in a railroad shop.

For the purposes at hand, the arrangement described seems to be ideal and one would be hard put to make any suggestions for improvement. All of the equipment is modern and is well maintained. Working as they do under ideal conditions the men take pride in keeping the machinery fit and work place clean and orderly. There can be no doubt that the entire "atmosphere" of the shop is reflected in the quality of the work produced.

Steel "Clothes" For Streamlined Street Flusher

TODAY machinery is not only guarded for safety but "clothed" for appearance's sake. And that creates just one more important new outlet for the steel industry's increased capacity for flat-rolled steel. The streamlined street flushing truck shown below is one of 75 that were recently purchased from the Municipal Supply Co., South Bend, Ind., by the New York City Sanitation Department. The tanks were made by The Heil Co., Milwaukee, and the sheets of which they were fabricated were rolled on one of the Bethlehem Steel Co.'s new continuous mills.

Following modern trends, the water tank is completely covered by a shield which is streamlined to suit the contours of the truck chassis. Side skirting, extending downward to the middle of the wheels, hides all pipe connections, braces, and grease-smeared mechanisms. Even the rear end of the flusher carries out the streamline motif, curving downward in a beaver-tail design and fitted with two doors to facilitate pump inspection. All-welded construction made it a simple matter to obtain strong tight joints throughout in the tank construction which embodied a number of compound curves. Spot welding is utilized in integrating skirting with tank as well as in securing both the tank and the skirting to the frame.

Experience With Balanced Blast Cupola

By W. LEE ROUECHE
McWane Cast Iron Pipe Co.

THE balanced blast cupola, which is a development of the British Cast Iron Research Association, has recently been introduced into the United States, and of a total of seven now operating here, three are operated by the McWane Cast Iron Pipe Co., Birmingham. Our experience with the balanced blast cupola being completely at variance with an article that recently appeared in THE IRON AGE (issue of July 29)* on cupolas with multiple and adjustable tuyeres, we thought that a recitation of our actual experience and some figures on the same size cupolas, operated both before and after conversion to the balanced blast system, would prove of interest.

The research and development work of the balanced blast cupola covers a period of 15 years, and since it was first introduced in England, in 1930, over 150 balanced blast cupolas have been put into operation in that country, the United States and ten other foreign countries. Sixty of the leading foundries in England are operating balanced blast cupolas, and the average number working in each of these foundries is in excess of two. One large English foundry is operating twelve balanced blast cupolas, and is at the present time installing two additional units.

While to a large extent it is the function of the blower to control the total quantity of air entering the furnace, it is through the size, location and number of tuyeres that the distribution of the air is controlled.

The McWane Cast Iron Pipe Co. put its first balanced blast cupola into operation Nov. 2, 1936. The operation was so thoroughly satisfactory that steps were immediately taken to convert a second cupola, which was put into service in the early part of April, 1937. Operating data given in this article is the result of the writer's personal experience and is taken from the company's operating records.

Figs. 1 and 2 show the front and rear view of the two duplicate 72-in. conventional stacks, which were converted and are now operating as 66-in. balanced blast cupolas. They are designed for continuous melting and slag from the front, which is clearly shown in the photographs.

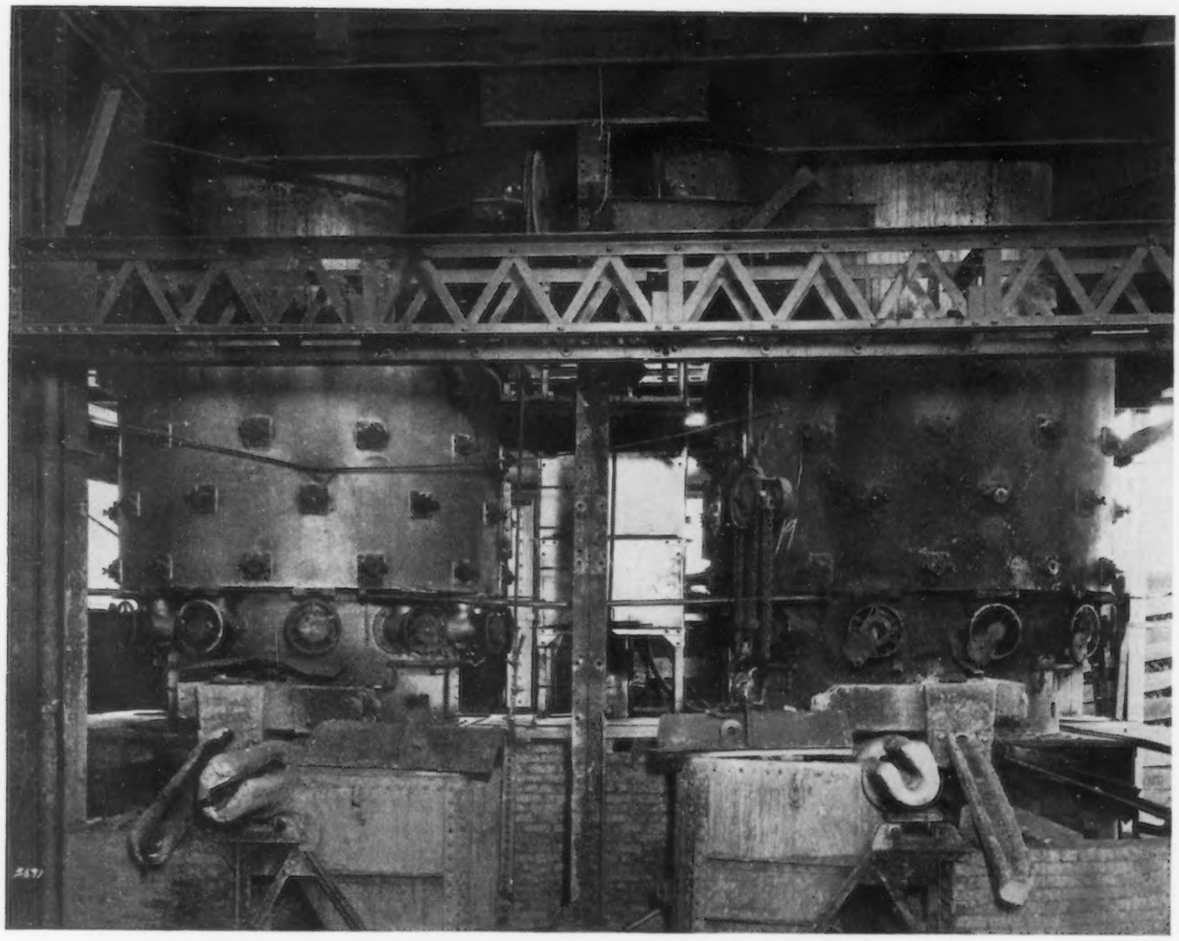
Tables I and II show typical results obtained from the 72-in. cupolas prior to their conversion to the balanced blast system. The castings produced are required to meet rigid specifications as to chemical analysis and physical properties, necessitating iron of uniform analysis and requiring accurate control of cupola operations. The blowing equipment consists of two 1½-lb. centrifugal blowers equipped with full automatic weight control. This equipment was in service some six years prior to the conversion to the balanced blast system, and careful operation had developed a maximum coke ratio of 10 to 1 between charges. That the efficiency of the

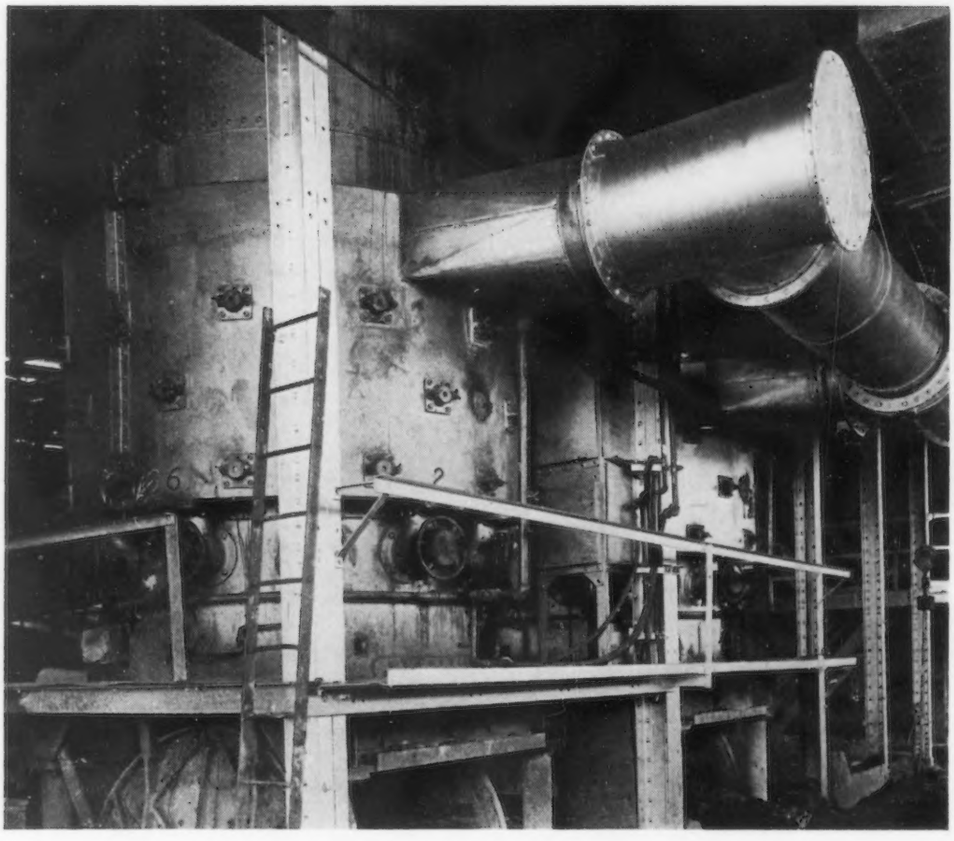
TABLE I

Chemical Analysis of Metal from a Conventional 72-in. Cupola

Date	Calculated Analysis				Actual Analysis			
	Si	S	Mn	T.C.	Si	S	Mn	T.C.
9/22/36	1.70	0.080	0.52	3.28	1.75	0.074	0.54	3.36
9/24/36	1.76	0.080	0.48	3.49	1.72	0.079	0.43	3.50
9/26/36	1.75	0.078	0.51	3.53	1.73	0.076	0.49	3.46
9/29/36	1.81	0.077	0.54	3.41	1.85	0.074	0.50	3.43
10/1/36	1.80	0.078	0.50	3.48	1.84	0.071	0.50	3.47
10/5/36	1.78	0.081	0.51	3.49	1.83	0.075	0.46	3.48
10/7/36	1.77	0.083	0.56	3.41	1.82	0.083	0.46	3.49
10/9/36	1.76	0.081	0.50	3.41	1.69	0.081	0.45	3.42
10/12/36	1.77	0.082	0.54	3.44	1.77	0.080	0.44	3.39
10/14/36	1.75	0.080	0.47	3.44	1.72	0.078	0.47	3.43

*Articles in THE IRON AGE, Jan. 10 and May 21, 1936, describe balanced blast operation.





ABOVE

FIG. 1—Front view of two 72-in. stacks after conversion into 66-in. balanced blast cupolas.

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AT LEFT

FIG. 2—Rear views of the 66-in. balanced blast cupolas shown in Fig. 1.

cupola operation was above the average is evidenced by the data given in Tables I and II.

Tables III and IV give results obtained with the same cupolas after conversion to the balanced blast system, using the same blowing equipment and with the same grade of coke. Fig. 3 is a companion record of spout temperatures for results shown in Tables III and IV.

In a properly designed and operated balanced blast cupola, the heat losses due to carbon monoxide (CO) in the waste gases are held to a minimum, as is evidenced by the elimination of all flame at the charging door. A study of Tables II, IV and V furnish an interesting comparison in this connection. Table V gives the comparative fuel losses for various percentages of CO in the waste gases, based on coke containing 90 per cent fixed carbon. Table II, for the conventional cupola, shows an average of 14.5 per cent CO at the charging door, or an overall fuel loss of 38.6 per cent. Table IV, for the balanced blast operation, shows an average of 4.3 per cent CO at the charging door, or an overall fuel loss of 13.4 per cent. Assuming the same coke ratio were used on both operations, the net fuel saving would then be 25.2 per cent in favor of the balanced blast system. The records show an actual net saving in excess of 35 per cent. It will also be noted that these savings were obtained with an average increase in temperature at the spout of 40 deg. F.

The balanced blast cupola requires no more labor to operate or attention to details than would be required by any conventional cupola. The valves and tuyeres are accurately designed and placed for a given normal melting rate per hour. This melting rate per hour can be varied to suit fluctuating demands within the same limits as can any conventional cupola of good design.

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FIG. 3 — Temperature records for the 66-in. balanced blast cupola. Ten consecutive heats shown.

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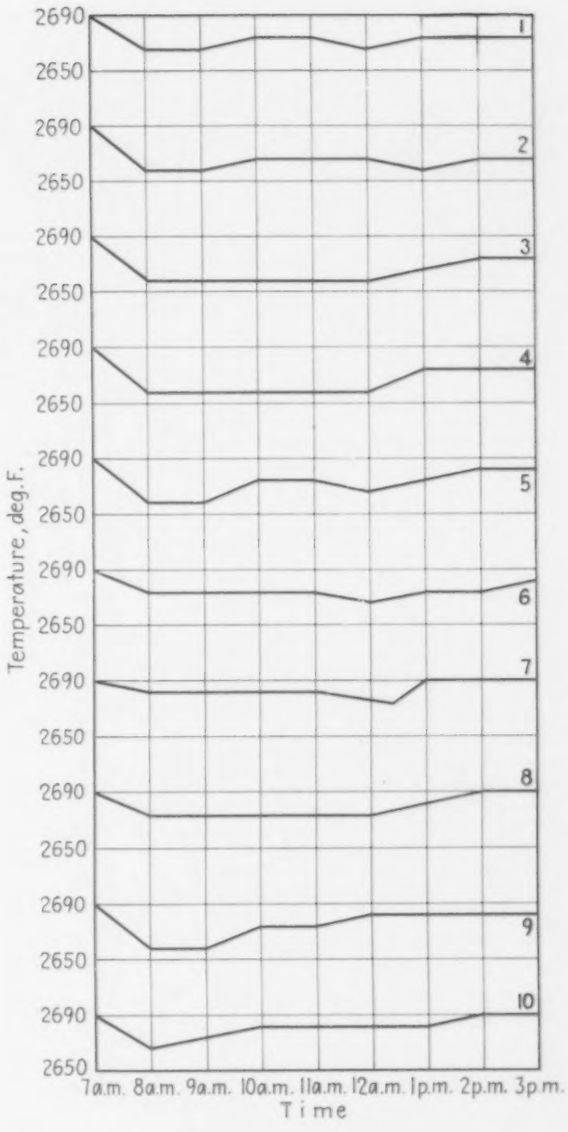

When a furnace is put into service, the proper setting for the auxiliary tuyeres is developed after the first two or three heats. Once determined, this setting for the auxiliary tuyeres is not altered. It has been found by experimentation that there is a definite setting of the main valves which best suits a particular size and quality of coke, weight of iron charges used, and which produces the best results. Once determined for a given set of conditions, which is done in the first one or two heats, this setting is not changed during a heat.

In the design of the main valves is an adjustment which makes it possible to close off any individual valve independently of the others.

TABLE III

Chemical Analysis of Metal from a 66-in. Balanced Blast Cupola

Date	Cupola No.	Calculated Analysis Si	S	Mn	T.C.	Actual Analysis Si	S	Mn	T.C.
9/15/37	3	1.73	0.075	0.45	3.49	1.71	0.068	0.43	3.47
9/16/37	2	1.75	0.072	0.46	3.49	1.80	0.073	0.44	3.49
9/17/37	3	1.74	0.072	0.47	3.50	1.70	0.066	0.48	3.51
9/20/37	2	1.81	0.070	0.46	3.52	1.80	0.064	0.46	3.53
9/21/37	3	1.83	0.071	0.44	3.52	1.81	0.073	0.47	3.53
9/22/37	2	1.84	0.074	0.44	3.50	1.78	0.073	0.46	3.52
9/23/37	3	1.84	0.074	0.46	3.52	1.82	0.073	0.49	3.54
9/24/37	2	1.83	0.075	0.48	3.50	1.82	0.068	0.50	3.51
9/27/37	3	1.83	0.072	0.48	3.49	1.86	0.068	0.51	3.51
9/28/37	2	1.84	0.070	0.46	3.52	1.80	0.069	0.47	3.52

NOTE: In calculating the analysis of the mixture the following allowances were made: Si, minus 19 points; S, plus 27 points; Mn, minus 5 points; and C, minus 7 points.

TABLE II

Melting Record for the 72-in. Cupola

Date, 1936	9/22	9/24	9/26	9/29	10/1	10/5	10/7	10/9	10/12	10/14
Weight bed coke, lb.	4030	4030	3960	4050	4070	4040	4000	4030	4000	4100
Weight, bed coke reclaimed, lb.	980	580	750	960	1020	938	860	785	1050	1260
Weight of limestone charge, lb.	200	200	200	200	200	200	200	200	200	200
Weight of iron charge, lb.	4200	4200	4200	4200	4200	4200	4200	4200	4200	4200
Weight of coke charge, lb.	410	410	410	430	410	410	430	430	430	430
Coke ratio between charges	10.2	10.2	10.2	9.8	10.2	10.2	9.8	9.8	9.8	9.8
Time iron down, min.	8	9	9	9	8½	8½	8½	8	8	8
Time slag down					No Record					
Total melt, net tons	128.0	146.4	130.1	159.4	142.7	136.4	116.6	152.3	165.7	146.8
Melting rate per hr., net tons	17.8	18.4	18.1	18.5	19.3	17.8	16.4	18.7	20.2	19.7
Pounds air per min.	400	440	440	440	445	440	435	472	490	475
Average temperature at spout, deg.	2625	2627	2627	2627	2627	2627	2627	2628	2629	2630
Per cent CO at charging door	15.6	16.6	14.4	12.4	15.6	14.8	15.6	14.8	10.4	14.4
Number times cupola down	2	2	3	...	4	1	4	...	...	...
Total time down	55	36	76	36	63	61	86	37	30	78
Total net melting time	7-12	7-59	7-10	7-20	7-22	7-40	7-5	8-8	8-12	7-27

TABLE IV

Melting Record for the 66-in. Balanced Blast Cupolas

Date, 1937	9/15	9/16	9/17	9/20	9/21	9/22	9/23	9/24	9/27	9/28
Cupola number	3	2	3	2	3	2	3	2	3	2
Weight bed coke, lb.	4400	4400	4400	4400	4400	4400	4400	4400	4400	4400
Weight bed coke reclaimed, lb.	2000	2284	2500	2286	1000	2417	2219	2434	2300	1336
Weight of limestone charge, lb.	150	150	150	150	150	150	150	150	150	150
Weight iron charge, lb.	5600	5600	6250	6250	6250	6250	6250	6250	6250	6250
Weight coke charge, lb.	400	400	400	400	400	400	400	400	400	400
Coke ratio between charges	14.6	14.3	15.3	15.3	15.3	15.3	15.3	15.3	15.3	15.8
Time iron over spout, min.	12	13	11	11	11.5	11	11	11.5	12	11.5
Time slag down, min.	34	36	37	39	36	34	39	41	42	32
Total melt, net tons	183.60	186.40	191.80	194.80	190.00	194.80	190.00	173.80	200.80	180.60
Melting rate per hr., net tons	23.53	23.89	25.29	25.85	24.00	25.62	24.51	23.91	24.19	23.65
Pounds air per min.	425	450	450	450	450	450	450	450	450	440
Average temperature at spout, deg.	2665	2660	2660	2660	2665	2675	2680	2670	2665	2670
Per cent CO at charging door	5.6	5.6	5.8	5.4	3.6	3.2	3.8	5.4	5.0	4.6
Number of times cupola down	2	4	4	5	2	5	4	7	3	5
Total time down, min.	57	64	66	67	45	54	51	94	9	58
Total net melting time, hr. and min.	7-48	7-48	7-35	7-32	7-55	7-36	7-45	7-16	8-18	7-38

TABLE V

Comparison of Gas Analyses and Heat Losses

Gas Analyses, Per Cent			Heat Loss, B.t.u.		
CO_2	CO	Carbon Burned to CO, Per Cent	Per Pound Carbon	Per Pound Coke, 90 Per Cent C	Fuel Loss, Per Cent
19.6	2	9.3	949	854	6.5
19.1	3	13.6	1387	1250	9.5
18.5	4	17.8	1815	1633	12.5
17.8	5	21.9	2234	2011	15.4
17.3	6	25.8	2632	2369	18.1
16.7	7	29.5	3009	2708	20.7
16.1	8	33.2	3386	3047	23.3
15.4	9	36.8	3754	3379	25.8
14.8	10	40.3	4110	3699	28.2
14.2	11	43.6	4447	4002	30.6
13.6	12	46.9	4784	4306	32.9
13.0	13	50.0	5100	4590	35.0
12.3	14	53.2	5426	4883	37.3
11.8	15	56.0	5712	5141	39.2
11.3	16	58.6	5977	5379	41.1
10.7	17	61.4	6263	5637	43.0
10.1	18	64.1	6538	5884	44.9
9.5	19	66.6	6793	6114	46.7
8.9	20	69.2	7058	6352	48.5

When a valve is closed off for a few minutes, any frozen slag or metal which has formed at the tuyere opening is quickly melted away, leaving the tuyere clear and free from obstructions. By a system of consecutively closing off each valve for a period of seven to ten minutes, the tuyeres are kept open at all times, resulting in a clean drop and no bridging. This opening and closing of the valves is taken care of by the regular cupola tender.

The exceptionally high temperatures obtained in the heating zone of the balanced blast cupola and the attendant fuel savings is easily explained. In the conventional cupola, with a single row of tuyeres, the air entering the lower part of the bed combines with the carbon to form CO_2, which as it passes through the upper levels of the bed is partially reduced to CO, thus lowering the effective temperature at the top of the bed where it is most needed. In the balanced blast cupola this reduction of CO_2 to CO, with the consequent heat loss, is prevented by the proper balance of air which is delivered to the upper levels of the bed through the auxiliary tuyeres. The descending heavy metal charges quickly reduce the temperature of the ascending gases, thus preventing the excessive formation of CO in the coke charges above the heating zone.

Lubrication of Timken Roll Neck Bearings

By O. L. MAAG
Lubrication Engineer, Timken Roller Bearing Co.

EVERY day brings new problems to the lubrication engineer. Lubricants must be properly applied as well as properly compounded. Intelligent selection of the type and grade to be used must be made since every bearing application presents its particular problem.

The accompanying remarks on lubrication of antifriction roll neck bearings are abstracted from the author's paper entitled "Roller Bearing Lubrication Problems," presented before the National Lubricating Grease Institute at Chicago.

THE severe service imposed on roll neck bearings in rolling mills presents an interesting problem in lubrication. Usually loads are quite heavy, and often operating conditions arise that impose many times the normal load. Water complicates the problem and temperatures must likewise be considered. Each mill presents an individual problem and while general principles may be stated, expert individual analysis is essential to best results.

In addition to lubricating the bearings, any roll neck bearing lubricant must supplement the seals and closures and aid in keeping water and scale out of the bearings. Consequently the grease must be as heavy as possible, yet soft enough to properly lubricate the bearing. Some greases have the ability to hold a considerable amount of water as an emulsion before thinning out too much. This is at times a desirable feature, for as long as the water is held in an emulsion it is not likely to etch the bearing surfaces. Once the saturation point is passed, free water in the form of globules appears and etching and corrosion follow.

The average water repellent grease used in steel mills will carry from 20 per cent to 25 per cent of water in emulsion before giving much trouble. However, the degree of thinning varies over a wide range with different greases, some thinning out to the danger point with an amount of water that apparently has little effect on others. This condition is controlled in some cases by the use of a mixed base grease, varying percentages of soda soap grease being added to the water repellent lime soap grease to improve emulsifying properties and reduce the danger of globules of free water etching or corroding the bearing surfaces.

Differences in Consistency

Another factor that gives trouble is the wide difference in consistency that now too frequently exists between worked and unworked greases. Unworked greases that thin out in service allow the entrance of more water and scale than do those greases that maintain a uniform consistency. Consequently, we recommend that lubricant manufacturers bear this item in mind when studying mill conditions and recommending lubricants for use in applications exposed to water.

Fortunately, water or grease containing water in the form of an emulsion is thinner than fresh grease. Consequently, careful attention to lubrication will enable an

operator to control the danger of water etching by the periodic addition of fresh lubricant. The fresh lubricant forces the water and thin used grease out of the housing, either through a grease outlet or overflow or past the closures, and recoats the bearing surfaces with fresh dry lubricant capable of providing the necessary corrosion proof coating. It is therefore advisable to inspect the old lubricant forced out of the housings from time to time to see that all the emulsified material has been removed and that only clean lubricant is in the housing.

EP Lubricants

EP lubricants have established themselves in many fields, the outstanding applications being in rolling mills and industrial power transmissions and in hypoid and heavy duty axles. We recommend the use of EP lubricants for all types of bearings in steel mill heavy duty service and have noted good results from the lime-lead-soap-sulphur, lime-soap-sulphurized base, and the lead-soap-sulphur-chloride base products as well as those using a chlorinated or phosphorous compound base. Under normal conditions it is not advisable to mix types. In all cases we recommend that any EP lubricant carry a 33 lb. lever load on the Timken lubricant tester.

Where emergency operating conditions develop, necessitating the use of an EP product in applications normally lubricated with a straight petroleum base lubricant, we have found that the addition of approximately 20 per cent of an EP sulphurized base to the lubricant normally used will raise its load carrying capacity to from 33 to 43 lb. on the Timken tester. Adding approximately 5 per cent of hexachlorethane will raise the load carrying capacity of a normal lubricant to approximately 75 lb.

Where a mill accident has caused scoring of the bearing surfaces, we have made good use of the mild abrasive properties of sulphur by adding approximately 2 per cent of flowers of sulphur to the lubricant. This imparts extreme pressure properties to the lubricant and enables it to carry the load during the period while the scoring is being eliminated by the mild abrasive action of the sulphur. This abrasion is not severe, but it is sufficient to smooth up the bearing surfaces unless they are too badly scored, in which case factory attention is required. However, as soon as smooth surfaces have been restored, it is essential that the treated lubricant be removed. This is done by adding new lubricant under pressure, thus forcing out the sulphurized material. By doing this we avoid the possibility of further abrasive or corrosive action. In all cases we recommend for normal use only those lubricants which are free from either abrasive or corrosive action.

Ordinarily, we feel that manufacturers of EP lubricants should stock about three consistencies, which we have found ample to meet practically all mill operating conditions.

General Applications

When selecting a lubricant, the most adverse conditions should govern, giving due consideration to all factors such as bearing size, speed, temperature and load. Ordinarily either a lime or soda soap grease may be used for bearings not over 6 in. in diameter operating at speeds below 1000 r.p.m. However, moisture conditions would ordinarily restrict the selection to the water repellent greases and high temperatures to the soda soap base greases. For bearings over 6 in. in diameter, medium or medium soft consistency greases may be used where operating speeds do not exceed 500 r.p.m. High speeds and high temperatures usually require oil lubrication.

Inorganic fillers of an abrasive or corrosive nature should be avoided, for while they may be useful in running in a rough bearing or smoothing up a damaged one, they will continue to cause wear and thus defeat the very purpose of a lubricant. EP lubricants may frequently be used to good advantage during the running in period, changing to the regular grease or oil after a single charge of the EP base. Hexachlorethane has been found useful in this connection as previously mentioned.

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THE illustration shows a sulphate pulp digester of welded steel construction, 42 ft. in length and 9 ft. 9 in. in diameter being placed in a stress relieving furnace at the Birmingham plant of the Chicago Bridge & Iron Co. Five of these were built by this company for the Union Bag and Paper Co. of Savannah. All joints were x-rayed before stress relieving.

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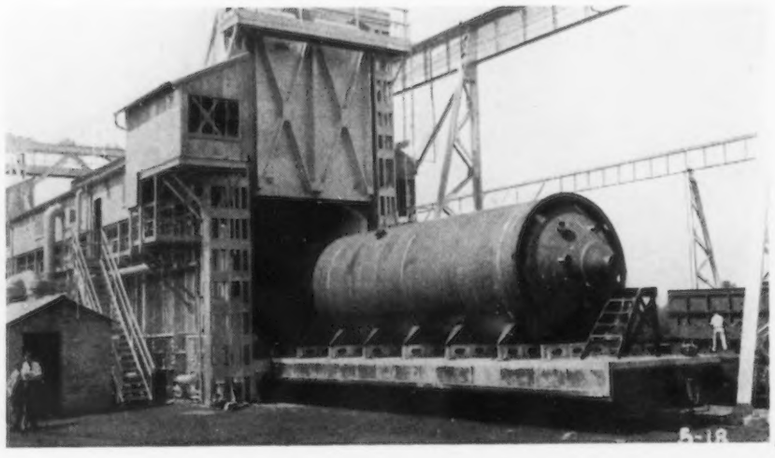

Fundamental Characteristics Of Chain Drives

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By FRANCIS JURASCHEK
Consulting Editor, The Iron Age

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A CHAIN drive partakes of many of the characteristics of two other completely dissimilar types of industrial power transmission equipment; the gear train and the belt. It is, however, in every sense of the word, a *positive* drive, because the transmission of power depends at all times on the positive mechanical interlocking of the chain and the teeth of the sprocket wheels, and never on frictional grip. Essentially, a chain drive consists of an endless belt composed of metallic links so formed as to permit the positive engagement of the teeth of two or more sprocket wheels with corresponding openings, or identations, or projecting lugs, of the chain links. It may therefore be termed "a flexible but non-elastic gear system operated by means of a flexible, but non-elastic positive engagement belt."

There is little doubt but that the basic type was developed by the Chinese many centuries ago, not for power transmission purposes, but for the handling of materials; and as such was the forerunner of our present day chain conveyors as a class, and of push-plate, flight and scraper conveyors in particular. According to Edward J. Tournier, in his "Materials Handling Equipment," "The Chinese Chain Pump . . . in the land of its origin was and is still known as 'Fan Tschi,' and 'Chin Chia.' The device consists essentially of an endless chain with a pitch of about 10½ in., with a plate fixed centrally to every link. There are two terminals, or sprockets; the upper, or driven one is generally hexagonal, while the lower is pentagonal, or occasionally hexagonal. The conveyor is disposed at various angles, and the lower, or working run passes through a trough, while the upper returns sliding on a board. The machine is made entirely of Mambau or Meranti wood, with the exception of the iron ferrules on the terminal shafts which serve as trunnions, and the wire nails serving as joint pins for the chain."

During the early days of the Industrial Revolution in England, when modern industrial power transmission was born, it is not clear whether chain drives were ever employed or not. Since in those days chain had to be fashioned link by link by hand, so that it

CHAPTER 24 of a comprehensive series on the Economics of Industrial Power Transmission.

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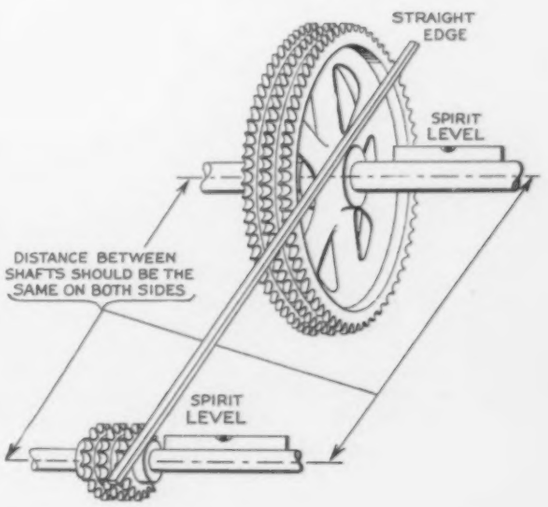

FIG. 1—Sketch showing principal points to be observed in the installation of a chain drive; shafts parallel and lever, sprockets in the same plane. Courtesy of Baldwin-Duckworth Chain Corp.

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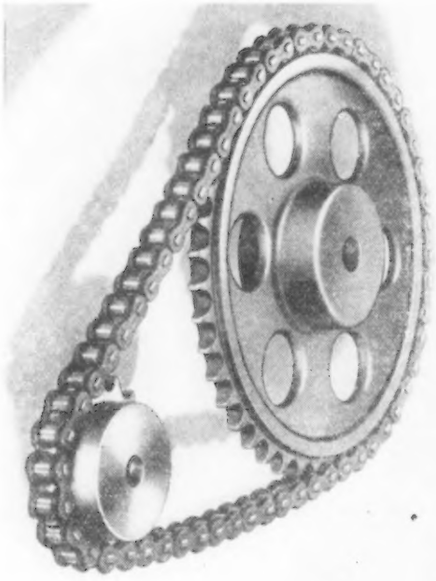

AT LEFT

FIG. 2—Detail of a typical finished steel roller chain drive, single strand. Courtesy of Morse Chain Co.

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FIG. 3—Detail of a typical silent chain drive with middle-guide flange-links. Courtesy of Morse Chain Co.

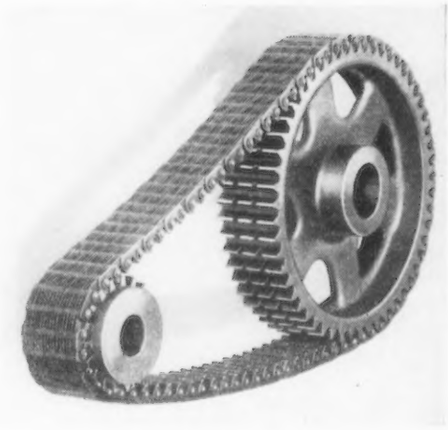

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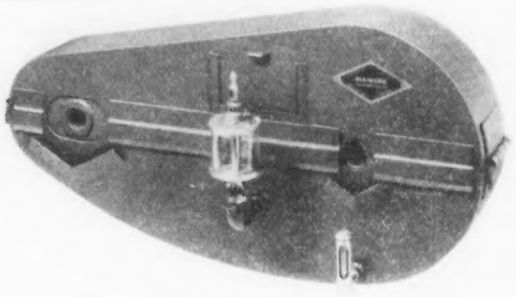
FIG. 4—Typical chain drive casing, adapted for automatic lubrication of the drive. Courtesy Diamond Chain & Mfg. Co.



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was almost impossible to control variations in the size and shape of each link, it is probable that the more easily manufactured rope and belt drives completely over-shadowed the development of the chain drive. In any event the commercially successful chain drive had to await two more recent technological developments, (1) the appearance of modern types of iron and steel of dependably uniform structure and high tensile strength, and (2) the coming of the modern punch press, which readily produces any required number of pieces of identical size and shape.

Every Link Identical

This thought leads directly to a statement of the first, and most important characteristic of the chain drive:

1—Each link of the chain must bear an exact pitch relation to every other link of the chain, and to the teeth of the sprocket wheel. (Chain pitch is the distance in inches between the center of any one link pin and the adjoining link pin, for one complete link of the chain.) The reason for this relationship is evident in a consideration of the motion of the chain over the sprocket wheel. It is, of course, a fairly simple matter to make a sprocket wheel with teeth of identical shape uniformly spaced around the wheel perimeter. As this wheel rotates on its axis, the links of the chain severally approach the sprocket teeth and become engaged therewith. Should the chain pitch vary at any point, this engagement will not be made easily or smoothly, since the link will "ride up" on the corresponding sprocket tooth, causing excessive friction, and wearing one side of the tooth as well as the under side of the link. If several consecutive links vary in pitch the errors become accumulative, and the chain may ride so high on the sprocket teeth as to jam, causing the drive to stall, and possibly damaging the source of energy as well as the drive itself.

Herein lies the true reason why chain drives were not developed earlier. Until the advent of the punch press, it was not commercially feasible to fashion every link in a chain identical with every other link. When it became possible to make a chain with completely interchangeable parts, the chain drive became feasible. With continuing improvements in design, particularly of the pins connecting one link with another, chain drives have become deservedly popular, for they form the means of making a *positive* application of power between shafts widely separated. In the two other types of positive power application, direct coupling requires that the driving and driven shafts meet in the coupling in one straight line, and gear drives require that the two shafts either meet in the gear drive in the same line or at an angle, or that they lie close together so that the adjoining gears meet. With chain drives the two shafts may be quite far apart. But consideration of this condition leads to a statement of the second characteristic of chain drives:

Parallel Shafts

2—The driving and driven shafts connected by a chain drive must be parallel. Again the reason is evident in a study of the motion of the chain over the sprocket wheel. As the chain approaches the teeth of the wheel, any deviation from the plane of the chain travel to the plane of the sprocket wheel will cause the links to enter their engagement with the sprocket teeth from one side, causing excessive friction, and wear of one side of the teeth as well as one side of the chain links. Likewise there will be a tendency to pull the sprocket

wheel bodily over to one side, causing excessive friction in, and wear of, the sprocket-wheel shaft-bearings.

Here the fault lies not in the design of the chain drive, but in its installation. To insure that this fault does not occur, it is necessary to see (1) that the driving and driven shafts are exactly parallel, and (2) that the driving sprocket and the driven sprocket of the chain drive are located in one and the same plane. When both these conditions are observed, the travel of the chain around one sprocket, to and around the other sprocket and thence back to the first, is in a single plane, without any tendency to twist sideways. The accompanying sketch, used as a guide for proper installation, illustrates these conditions perfectly.

Sprocket Size

A third characteristic of chain drives flows from the fact that, although a sprocket wheel is basically circular in shape, the chord between any two chain link pins engaged in the sprocket teeth is always a straight line, no matter what the running position of the chain may be. Consequently the chain in travelling around the sprocket wheel assumes the form of a polygon instead of moving in a true circle like a leather or rubber belt. Because of this the entrance engagement of each link with the corresponding sprocket tooth involves an impact blow. There is a definite "hammer action" of the link upon the tooth. It must be evident that the smaller the number of teeth in the sprocket wheel the more the chain travel around the wheel departs from a truly circular path, and that, especially at high speeds, the greater is this hammer action. This may be visualized by comparing the motion of travel of a chain around the six-sided body formed by a six-tooth sprocket, with the travel around a twenty-one sided body formed by a twenty-one tooth sprocket. Again, flexure of the chain joints increases as the diameter of the sprocket wheel decreases. As a result, good practice demands strict limits to the smallness in diameter and number of teeth in a sprocket wheel, particularly for drives which operate at high speeds. These limits vary, of course, with the type of chain, with the pitch of the chain, and with the speed of chain travel. Inspection of the tables of sprocket sizes published by American chain drive equipment manufacturers reveals these facts, which may be summarized as the third characteristic of chain drives:

3 — For slow speed drives, the number of teeth in the smaller sprocket wheel of a roller chain drive should not be less than 6, or for a silent chain drive, 17. It is generally conceded that a 17-tooth sprocket wheel is the minimum which should be used for smooth operation at medium or high speeds. Longer effective life will result from the choice of 19 or 21 tooth sprockets, when conditions permit their use. For all medium or high speed use, it is considered good practice to have an odd number of teeth in the smaller sprocket, if possible.

To illustrate the influence of chain pitch and chain speed on the design of any given drive, it may be assumed that it is desired to transmit five horsepower by means of a chain drive. Single strand finished steel roller chain of ½ in. pitch will require the driving sprocket to have 26 teeth for 500 r.p.m. (giving a chain speed of 2166 ft. per min.). The same chain will take a 17-tooth sprocket at 1000 r.p.m. (giving a chain speed of 2833 ft. per min.). Either of these drives will have a capacity of 5.4 hp. The nearest comparison in single strand ½ in. pitch silent chain would be a 40-tooth sprocket at 500 r.p.m. (giving a chain speed of 3333 ft. per min.), or a 21-tooth sprocket at 1000 r.p.m. (giving a chain speed of 3500 ft. per min.) either of which will have a capacity of approximately five horsepower.

Sprocket sizes will also be influenced by the desired ratio of increase or decrease of speed between the driving and driven shafts. For roller chain it is common practice to limit the ratio to 6 to 1. Although occasionally ratios as high as 10 to 1 may be used successfully, it is usual to split up ratios higher than 6 to 1 into two successive drives. For silent chain drives the accepted upper limit is an 8 to 1 ratio. Consequently, should the ratio desired result in the smaller sprocket being figured

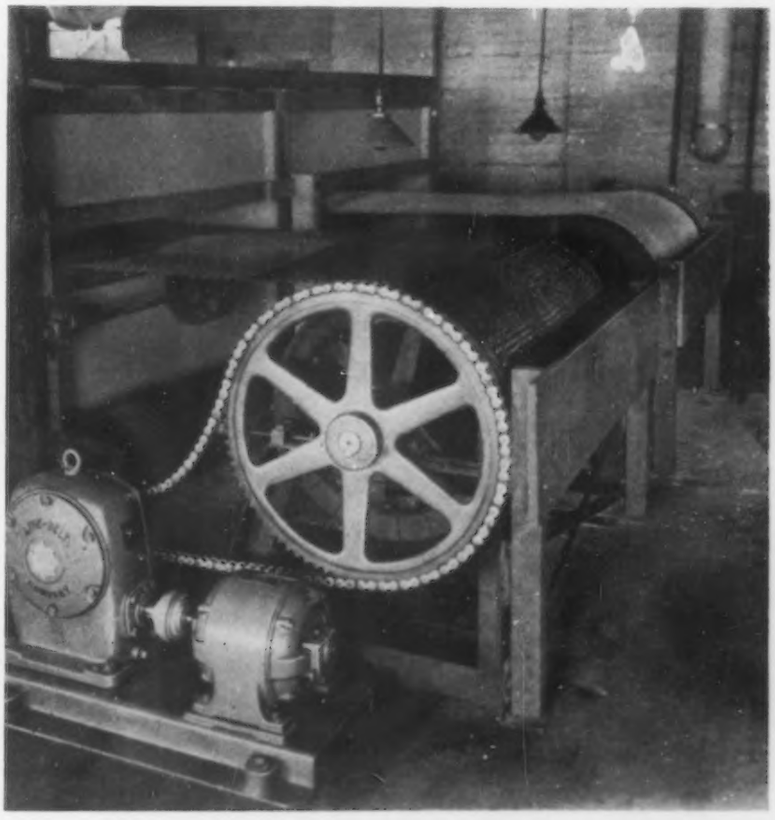

FIG. 5—Woven metal belt conveyor driven by Link-Belt single strand roller chain drive, 18 to 80 tooth sprocket ratio, from Link-Belt worm-gear reducer, 60 to 1 ratio, coupled to 1 hp. 1750 r.p.m. motor.

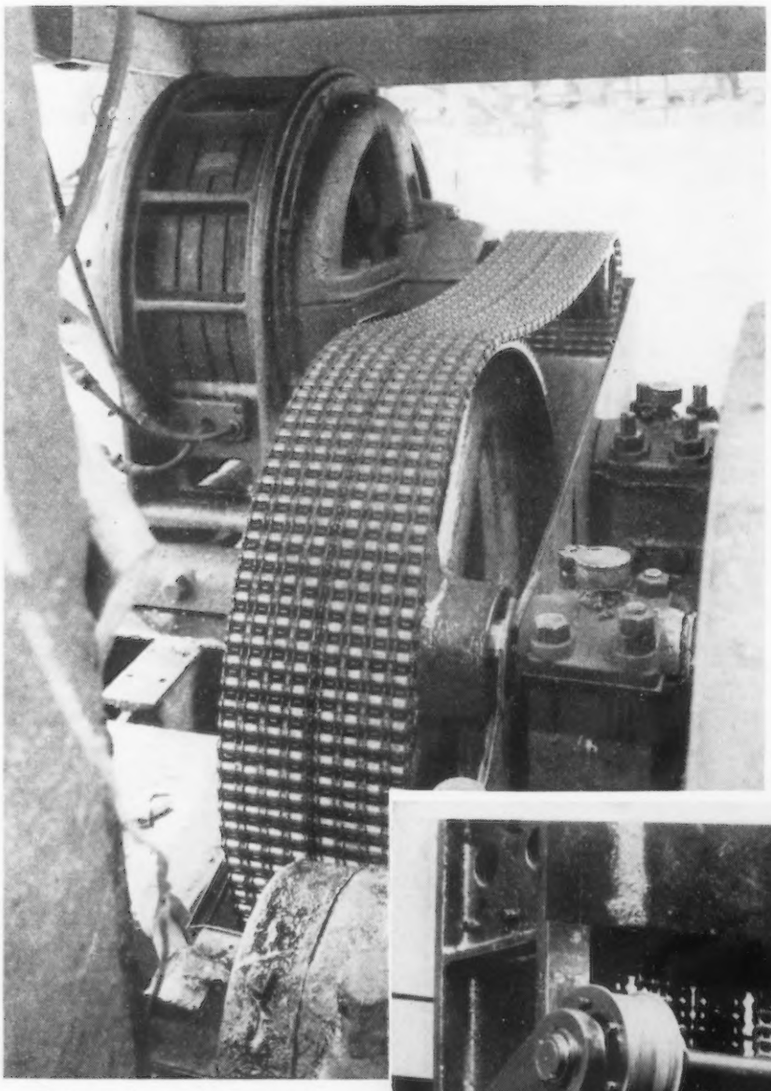

FIG. 6—Chain Belt Co. double-quadruple strand roller chain drive, upper cover of casing removed, on an open-air oil field production job.

at or less than the minimum number of teeth deemed to be good practice for the type and pitch of chain under consideration, it will undoubtedly be wise to shift to another set of factors in order to get away from that minimum. This introduces the fourth characteristic of chain drives:

Multiple Strands

In designing a chain drive the number of revolutions per minute and the size of the smaller (or faster-moving) sprocket determines the pitch of the chain to be used. Large pitch chains are best adapted for slow speed work; chains of small pitch lend themselves more readily to the higher speed drives. Smaller pitch chains will transmit power at higher speeds with less wear and more smoothness than larger pitch chains, and, in roller chain types, with less noise. Strand for strand, however, the larger pitch chains are stronger and are consequently credited with larger power transmitting capacities. But often there is no real necessity to depend upon single strand chains. Consequently:

4—A multiple strand chain of small pitch is often to be preferred to a single strand chain of large pitch. Multiple strand chains can, of course, be operated at the same speeds as single strand chains of the same pitch. Standard sizes are available in double, triple and quadruple strands; any chain manufacturer can readily assemble these unit widths into multiple strand

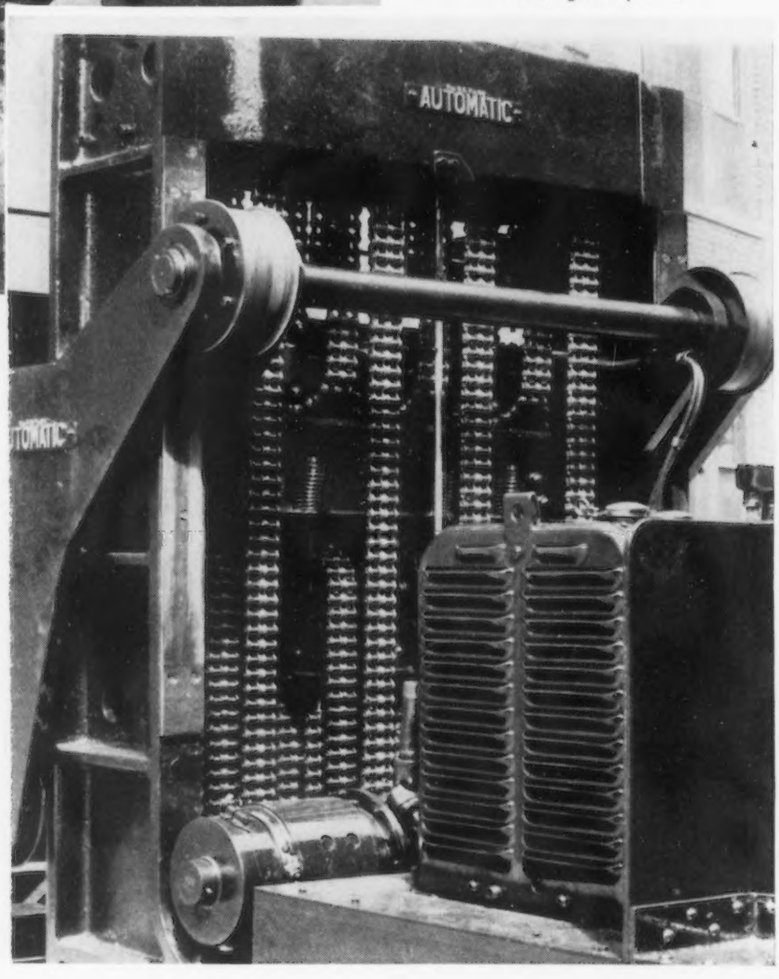

FIG. 7—Double strand Diamond roller chains operate the lift mechanism of this 30-ton capacity electric industrial truck, used for handling heavy dies.

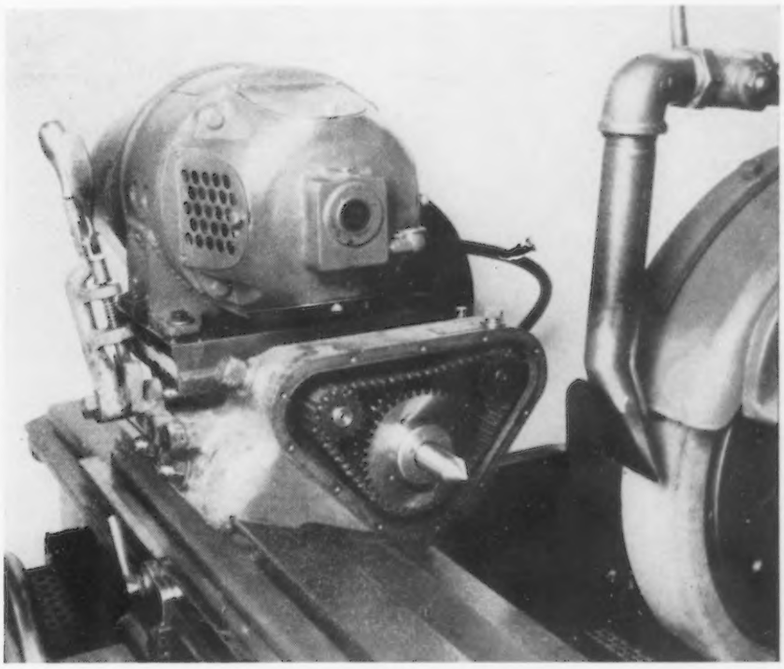

FIG. 8—Morse silent chain drive on work table of a high-speed grinder. Motor speed is first reduced through a gear train, then through the chain drive with one idler.

chains up to total widths of 30 in. or more, and supply corresponding sprocket wheels to order. An actual example showing the comparison of a 1-in. pitch single strand roller chain with a ½-in. pitch triple strand roller chain of the same capacity, is illustrated herewith. The shorter pitch multiple strand chain may be run at nearly three times the speed of the larger pitch chain, more smoothly and therefore with greater efficiency, with less wear and tear on the drive equipment and therefore with less maintenance cost.

5—A fifth chain drive characteristic is the need for guiding the chain over the sprocket wheel. In a V-belt drive, the pulley grooves perform this function. In a flat-belt drive, the crowned pulley tends to make both sides of the belt ride up toward the middle of the pulley, and thus guides the belt travel. In a roller chain drive the sides of each link, fitting over each sprocket tooth, form their own guides and keep the chain running truly over the wheel. But with silent chain drives it is necessary to prevent the chain slipping sideways off the sprocket wheel. The two generally accepted means employed are (1) rarely, to provide flanges or plate or wire on each side of the sprocket wheels, and (2) usually, to incorporate flange links as component parts of the chain, either in the form of a middle-guide flange-link in the middle of the chain to run in a corresponding groove cut in the middle of the sprocket wheel face, or in the form of side-guide flange-links on each side of the chain to extend over the sides of the face of the sprocket wheel.

Regarding the choice of the guiding method to be used with silent chain drives, William Staniar in his "Mechanical Power Transmission Handbook" says, "When accurate alinement of the sprockets can be maintained and the shafting held rigid, any method of guiding is satisfactory. Thus, when the drive is an integral part of the machine, the middle-guide or side-flange chain results in lower first cost. The choice between middle-guide and side-flange rests almost entirely upon the structural detail of the sprockets. When independently mounted motors are not likely to remain in accurate alinement, the use of a wire flange on the

(CONTINUED ON PAGE 96)

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FIG. 9—Link-Belt triple width silent chain drive operating main shaft of 8-in. steel rolling mill on 50-in. centers: 700 hp. motor, 23-tooth driving sprocket and 54-tooth driven sprocket.

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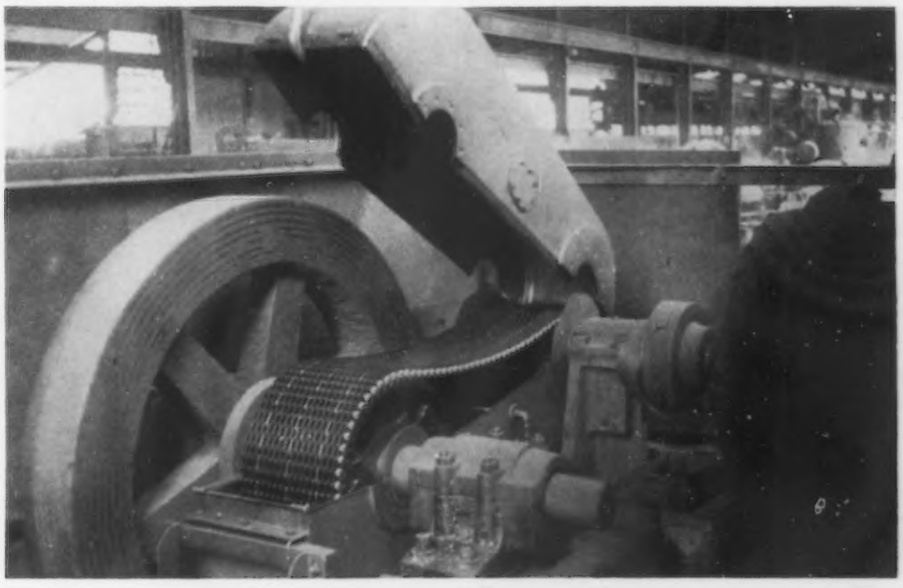

Electric Ram-Trucks Speed Up Strip Handling at New J. & L. Mill

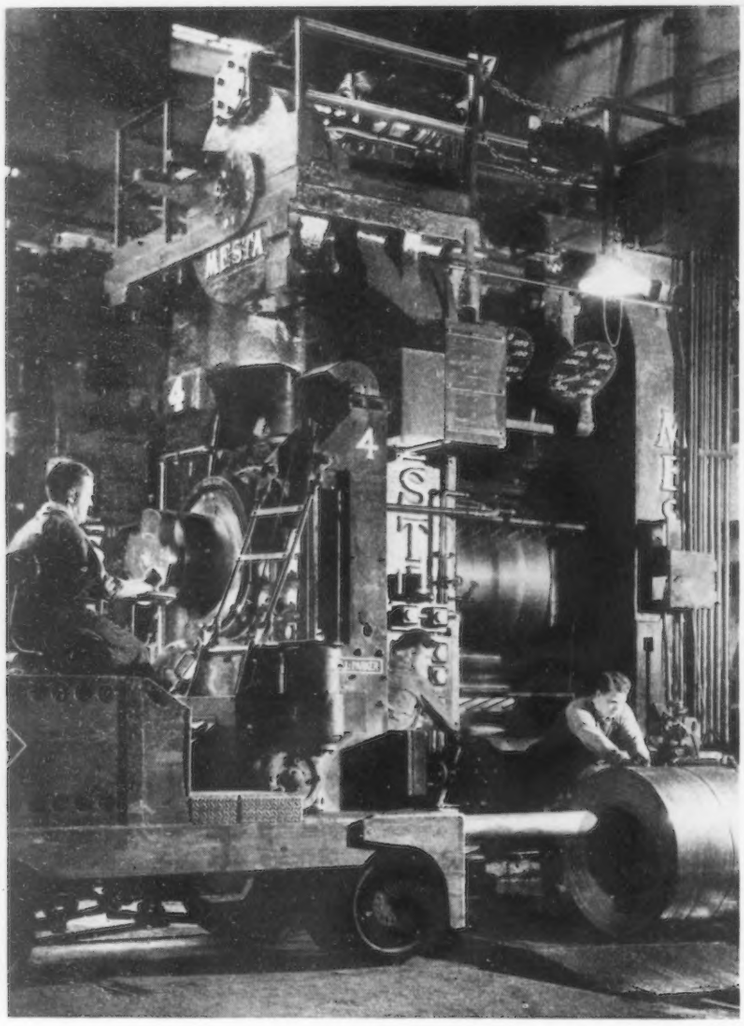

FIG. 1—Ram-truck receiving a coil at delivery side of cold mill.

FIG. 2—Building up temporary surplus of coils by tiering two-high.

THE most recent use on a large scale of electric industrial trucks for handling coils of strip steel is to be found at the new 96-in. continuous strip mill of the Jones & Laughlin Steel Corp., at Pittsburgh. A fleet of Elwell-Parker elevating-ram trucks, powered with Exide-Ironclad batteries moves the mill output of cold strip through various processes with speed and precision.

The primary function of these trucks is to move the coils by stages from the hot mills to the cold mills, and to remove coils from the delivery side of the cold mills to storage or to other finishing equipment and finally into railroad box cars for shipment. The method of transporting coils from the hot to the cold mills involves no new principles of handling, but the handling methods beyond the delivery side of the cold mills include several points of interest.

There are two cold rolling mills; one a 54-in., four-stand tandem, and the other a 93-in., three-stand tandem. Deliveries from these mills may be stocked temporarily, or the coils may be delivered to cut-up units, to annealing ovens, or directly to the loading dock. From one of the mills full coils are lifted automatically at the delivery side, wired, and placed mechanically on the truck ram. This operation is

shown clearly in Fig. 1. When the coil is to be stored temporarily it is laid flat in the storage room, in tiers. Fig. 2 illustrates the ease and precision with which this tiering operation is accomplished.

From the other cold mill coils are delivered into a concrete trough deepening toward the far end, so that the coils roll its entire length by gravity and can be picked up and carried away by a truck in a single sweeping motion. Surpluses of coils are alternately accumulated and depleted several times each 24 hours. The build-up of one such surplus is shown in Fig. 2, and demonstrates the capacity of the trucks to tier coils two-high at a material saving in floor space, not only in a regular storage room, but also at convenient temporary storage locations adjacent to processing units or freight cars.

Fig. 3 shows a cut-up unit in operation, with a truck in the background delivering a coil to the unit. Between each stage of strip rolling operations the important process of providing identification for each coil is facilitated by the ram truck method of handling. As the ram picks up the coil, it is lifted a few inches above the floor and held in that position while it is being banded and marked, then raised to the carrying position while the truck moves it to its next operation. In Fig. 4 workmen are shown banding and marking a coil so held by the truck ram.

As Fig. 5 demonstrates, these

(Photos courtesy Ellwell-Parker Co. and Electric Storage Battery Co.)

ABOVE

FIG. 3—Truck delivering coils to feed end of cut-up unit.

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AT RIGHT

FIG. 4—Banding and marking a coil before delivery to next operation.

trucks take their loads directly into a box car, turn to the left or the right inside the car, and spot the loads exactly where they may be required until the car reaches its destination, repeating the loading operation until the car is properly loaded.

It is already apparent at this mill that the ram-truck method of handling coiled strip is fast, precise, and economical. Two battery-charging stands have been installed, and with a supply of extra batteries always being charged, the truck fleet is capable of being used continuously, 24 hours each day.

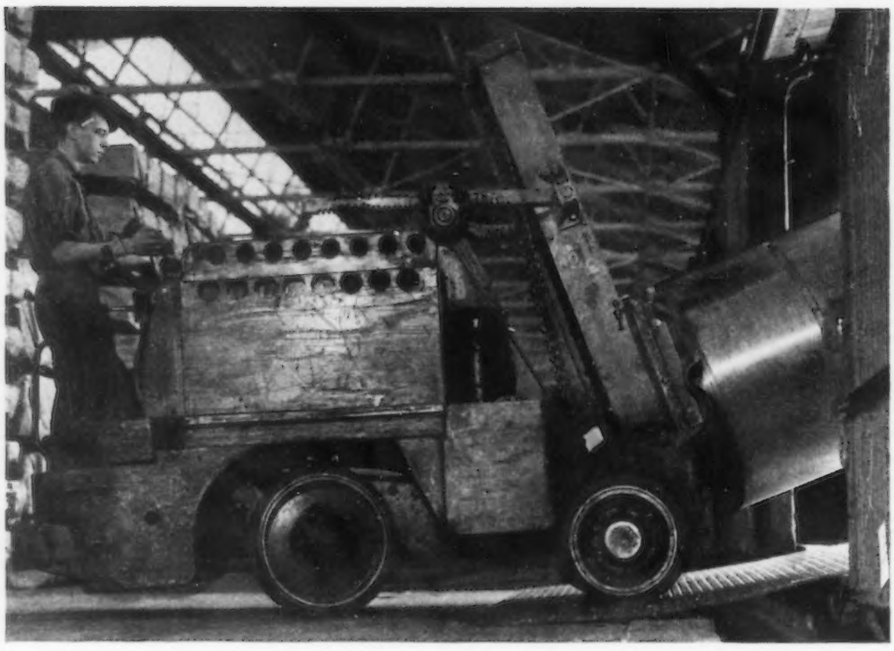
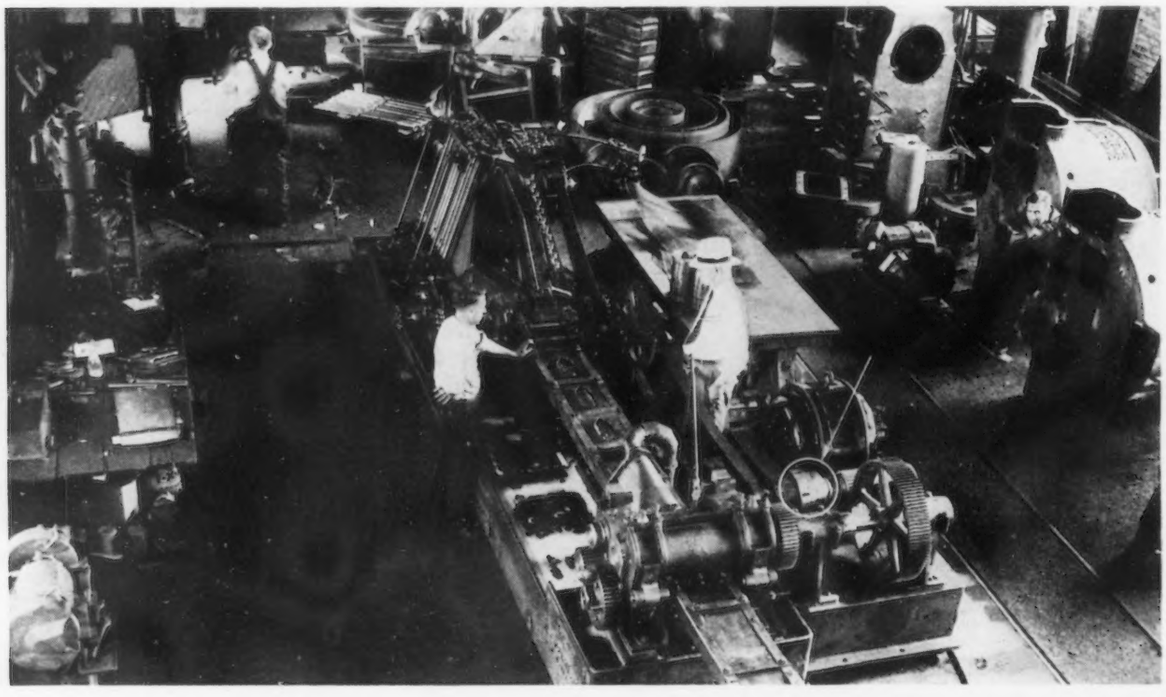


FIG. 5—Truck delivering a coil directly into box car for shipment.

THIS unusual-looking machine was produced by the Davis & Thompson Co. of Wilwaukee for L. E. Curtis, Thiensville, Wis., who designed it. The machine takes nine inch wide strips of steel and stretches them into metal lath, which looks something like oversize screening 27 inches wide. It is to be used by a Chicago manufacturer to turn out 2,000 yards of metal lath an hour, to be used in building construction as a base for plaster.

Unusual also is the application to this machine of the Stearns magnetic clutch marked by the circle and arrow. This clutch transmits the torque for the entire drive. It operates the rotary cutter in the foreground, which punches the 22-gage strip; the expander which stretches the material; and the system of levelling rollers at the far end of the machine. Complete control of every phase of the operation through the magnetic clutch is assured by start and stop buttons located at various control stations on the machine.

With this positive control, the ultimate capacity of the machine may be safely speeded up to 5,000 yards of metal lath an hour, at the rate of 250 feet per minute, a rate not possible with ordinary methods of control. The magnetic clutch, therefore, makes it possible to more than double the normal production capacity.



Cuts Spur or Helical Tooth Racks In One or Two Traverses

POSITION of the bed supporting the cutting head is controlled by a feed cam which, with change gears, controls the depth of cut and depth feed per stroke.

THE Fellows Gear Shaper Co., Springfield, Vt., has announced two new rack shapers designated as Nos. 3-48 and 3-60. These machines, which are arranged for cutting spur and helical tooth racks, are identical except for length of rack that can be cut. The No. 3-48 machine will cut rack lengths up to 48 in., and 3 in. face width; whereas, the No. 3-60 will cut rack lengths up to 60 in.

This new rack shaper is of extremely rigid construction. The base is of heavy box section, and carries a table mounted on ways and actuated by a lead screw and change gears. The bed is mounted on a similar box section base, located at right angles to the base carrying the table. The position of the bed, when the cutter is in action on the work, is controlled by a feed cam which, in conjunction with change gears, controls the depth of cut and the depth feed per stroke of the cutter. The saddle carrying the cutter-spindle is of the "relieving" type, and is mounted on substantial trunnions supported in the bed and actuated by a positive and smooth-operating relieving mechanism.

Operation of the machine is simplified by employing a complete electrical control, comprising push buttons and selector switches. These selector switches can be set by the operator so that the cutter can be operated from either end of the rack or in the center of the rack, and control the depth feed and traverse feed motions of the machine, as well as stopping the machine when the rack is completed. Various safety features are included.

The machine can be used to finish a rack in either one or two cuts by the setting of the selector switches, and operates automatically for the second cut without any attention on the part of the operator. That is, at the completion of the roughing cut, the cutter is automatically fed in to finishing depth, and the traverse feed engaged to traverse the rack table in the opposite direction.

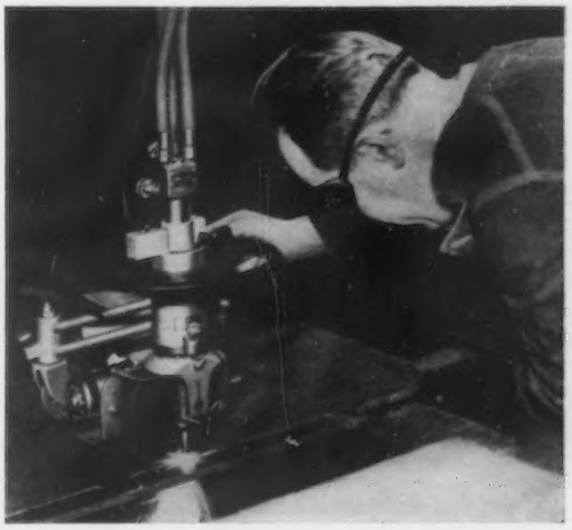
Machine is equipped with four motors: the main motor which operates the cutter spindle, etc.; compound pump motor; depth feed motor; and traverse feed motor. All motors are under the control of the selector switches and push buttons.

Small Portable Shape Cutting Machine

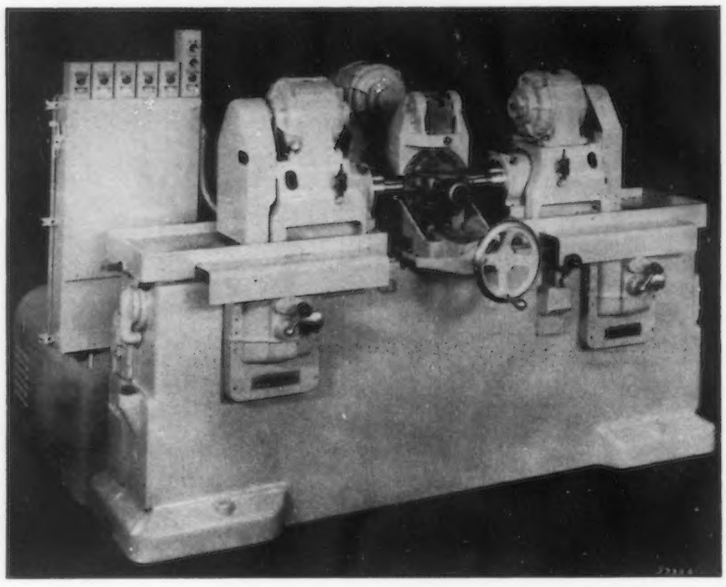
THE Oxweld Type CM-16 portable shape cutting machine has been designed to meet a definite need for a small machine for oxy-acetylene cutting in steel fabrication work. It will cut up to 4 in. in thickness and will automatically cut a circle from 2 to 36 in. by means of the radius rod furnished or even larger with a longer radius rod made of ½-in. square bar. It is a product of the Linde Air Products Co., 30 East 42nd Street, New York.

For shape cutting the machine is operated by the hand steering method, following the pattern chalked on the work. With the use of a track, it can make a straight cut on a piece smaller in area than the machine itself. A skid is provided to prevent the machine toppling off the work piece, should the operator fail to stop the motor in time. Rear wheels are connected to the machine by pivots which swivel like casters. These wheels are locked in alinement with the drive wheel for straight line work.

Tubular construction has resulted in an overall weight with blowpipe of only 45 lb. Dimensions are 20 by 16 in.



Flexibility Featured In 2 and 3-Way Precision Boring Machines



TWO and three-way type multiple boring machines have been added by Ex-Cell-O Corp., Detroit. The new equipment varies from two to nine boring spindles. The boring spindles and their individual motor drives are separately mounted on sliding tables. Table feed is by the Ex-Cell-O hydraulic system with individual pumps for each table. Spindles are standard Ex-Cell-O precision ball bearing type mounted in special heads for compactness and designed so other spindles in addition to those shown may be added. Cutting cycles are completely automatic.

Each head slide is provided with micrometer adjustment dogs for setting the distance for fast approach, cutting, dwell and fast return. The dwell period is adjustable from 1 to 30 sec. to insure desired finish characteristics. Rapid advance between two holes bored by one spindle may also be provided. Cutting speeds of 400 ft. per min. are possible with single-point carbide cutting tools in this machine. Feeding speed may be varied up to 42 in. per min.

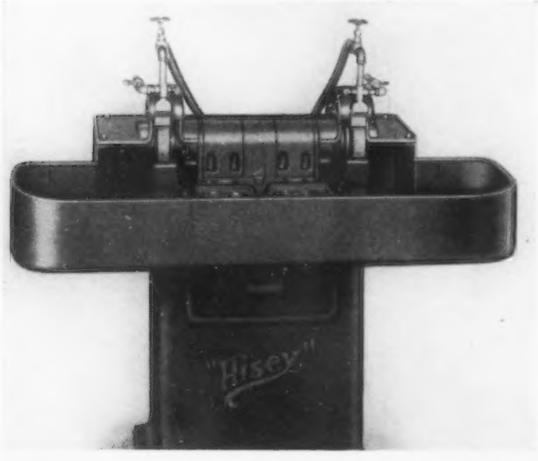
Fixture clamps may be of the manual, hydraulic or air operated type. The T-shaped base in the three-way machine is cast in one piece of nickel-chrome alloy iron, aged and normalized. Spindles are universally adjustable. Holes from ⅜ to 6 in. in diameter can be bored. Maximum table travel is 12 in.

The two-way machine, adapted to the machining of such parts as differential carriers, transmission cases, cylinder bores, connecting rods, pistons and pump bodies, is similar in design to the three-way model. It is available in several sizes. Spindle drive is through adjustable V-belts on both machines.

Wet Grinder Eliminates Dust Hazard

STRAINED water is recirculated and the flow controlled by convenient valves on top of the guards of the new Hisey "Texdrive" two-wheel wet grinders made by the Hisey-Wolf Machine Co., Cincinnati. By providing a constant stream of coolant on the wheels, dust is eliminated and dust collecting systems are avoided. A separator removes all grit before returning the water to the reservoir. The circulating pump is self-priming and is driven by means of V-belt from the spindle.

V-belt drive is also provided the spindle itself, and spindle speeds can be provided to suit conditions. Motors of any electrical characteristics are obtainable. The grinder is made in three sizes of 10, 12 and 14-in. wheel size.

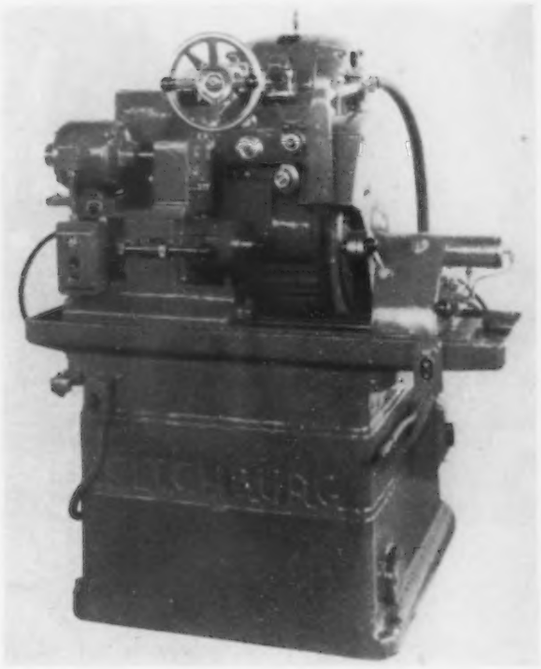


MOTORS of any electrical characteristic, with V-belt drive, are obtainable on this wet grinder, made with wheels of 10, 12 and 14 in.

Window Coating Reduces Snow Glare

THE Skybryte Co. of Cleveland, has announced a new product —Snopake—to reduce the excessive glare in buildings adjacent to open fields where large expanses of snow are present in winter. The product is a pale-green adhesive liquid that can either be brushed or sprayed on the windows. The manufacturers report that it admits over 90 per cent of the light, yet reduces it to mellow softly-diffused illumination. The liquid is applied to the inside or outside of the window and can be removed with hot water and stiff bristle brush.

Grinder Designed To Conserve Floor Space



A HYDRAULIC plunger flattens out a bowed leaf spring and thus imparts to the head feed movement which becomes most sensitive near the end of the stroke.

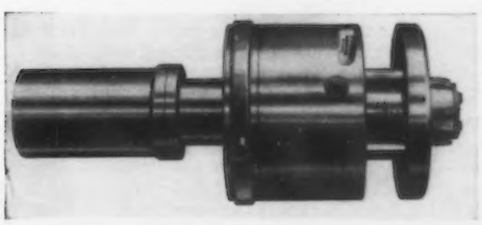
MINIMUM of floor space occupied is a feature of the plain cylindrical plunge-cut grinding machine here illustrated, which is being marketed by the Fitchburg Grinding Machine Corp., Fitchburg, Mass. There is no table traverse, but the machine is provided with wheel-spindle reciprocation. With a maximum swing of 14 in. over the table and maximum length of 12 in. between centers, this grinder occupies floor space of only 38 x 48 in.

The machine is built around one of the company's standard Bowgage wheel-head units, having a completely automatic cycle which is dial controlled from the panel. Head stocks can be furnished for either live or dead spindle operation and the complete cycle can be interlocked for operation by one lever. The machine can also be equipped with a retractable headstock-center and a solid footstock.

The grinding wheel is carried on the right-hand side of the spindle, instead of at the left, an arrangement emphasized as consolidating the wheel spindle space with the headstock longitudinally, and saving floor space. A chucking grinder model of the same machine is also available.

Receding Chaser Collapsible Tap For Couplings

THE Landis Machine Co., Waynesboro, Pa., announces a new addition to its line of collapsible and receding chaser collapsible taps. The Landis 3ALM is a tap of the receding chaser type that possesses a number of features that greatly increase the efficiency of its performance, both in the accuracy of the threads it produces and in the length of life of the chaser between grinds. This tap is made of high carbon steel and all parts are heat treated and precision ground. All surfaces have a sliding contact. It is fully enclosed. The 3ALM tap, designed primarily for the tapping of couplings, etc., may be applied to any machine employing a live spindle and where the resetting action is done automatically. There is no manually operated model.



The internal mechanism of this tap is similar to the standard LM tap in that it employs a cross slide cam to control the taper. It is possible to trip the tap at any position by adjusting a tripping bar so that it contacts the tripping button located in the body of the tap. This tap may be used for any taper of thread ranging from straight threads to ¾ in. taper per ft. and may be changed by infinitesimal degrees. To change taper or to adjust for a slight error, it is merely necessary to release a locking screw in the control collar and move the taper indicator. The cutting coolant is admitted to the tap through a bronze yoke ring, located at the rear of the control collar, and thence into the hollow tripping ring. The face plate of the tripping ring is perforated with a series of small holes directing the coolant within the coupling.

The range of the 3ALM tap is from 2 to 4 in. inclusive and the same tap heads may be employed as are used on the standard 4LM receding chaser tap.

Air Line Freeze Preventative

An improved system of air line and air tool freeze preventative known as "Frosto," is being marketed by the Sullivan Machinery Co., Michigan City, Ind., to supplement "Tanner Gas" which has been used on construction, industrial and mining operations. Frosto has been developed particularly for industrial applications. In operation, the Frosto is vaporized and fed into the compressed air line near the compressor as fast as necessary to prevent freezing of water vapor in the compressed air lines and air tools. Only about a quart of Frosto is required to treat 100,000 cu. ft. of free air under the worst conditions of temperature and humidity.

THIS WEEK ON THE ASSEMBLY LINE

. . . Auto industry at bottom of slide; depleted inventories starting flow of steel orders.

o o o

. . . Ford gives "full ahead" signal and authorizes suppliers to prepare for nearly half a million units.

o o o

. . . Registrations continue to show healthy volume; Buick rides crest of sales wave.

DETROIT, Nov. 29—Evidence is on hand to indicate that the automotive industry may have reached the bottom of the slide at last. Substantial but inconclusive data of a leveling-off have been uncovered in the last week. From a variety of sources we learn things that make brightened hopes seem reasonable and justified.

Orders for steel were placed during the week by Fisher Body to supply Chevrolet. Depleted inventory for this General Motors division was the explanation given when the steel was purchased. Total tonnages could not be learned, but apparently most of the steel producers got a portion. Delivery of this steel will start Dec. 13.

Fisher's purchase is not to be construed as the beginning of a sharp upturn, but rather as the first indication that the industry is at a leveling-off place with a more solid footing than it has enjoyed. From now on, others may be expected to reach the point where they will buy. Orders will not be very large for a while, but will step right along with production and should prove a most satisfactory gage to tell the state of the industry from now on.

Of course some of the manufacturers are still well supplied with material. Packard, for instance, not only has steel on hand in its shops, but has scheduled for first-of-the-year delivery some tonnage which was originally to be shipped by the end of September. However, with production going ahead steadily, there is no cause for anxiety here. The heavy stocks are attributable to the delayed start of Packard's assembly line because of its retooling difficulties.

o o o

DETROIT, Nov. 30.—Ford Motor Co. today confirmed reports that it would be in the market later this week or next week for a small quantity of steel. Ford's release of purchase authorizations to parts vendors was expected to bring the suppliers into the market within a few days.

Ford More Active

The air is vibrant again at the Ford Rouge plant. Orders went out last Tuesday to Briggs and numerous other suppliers to disregard schedules and start a steady flow of parts and assemblies to Ford. This had to be modified later in the week when things began to pile up at the Rouge and other assembly plants, but the "full ahead" order has been given for this week. Today Ford has nearly 40 carloads of frames which have been on the siding at the Rouge for about two weeks. It is understood that at branch plants throughout the country Ford is paying demurrage on many cars loaded with engines shipped out from Dearborn and awaiting assembly into automobiles. Trailers filled with stock, stampings and trim have been tied up inside the gates waiting to be unloaded.

Additional steel orders should be placed now by Ford suppliers because the company has authorized parts vendors to purchase long-term items, including steel, for an additional 100,000 units, both passenger cars and trucks. This raises the vendors' purchase authorizations from 355,000 to 455,000 units for the period ending Feb. 10, 1938. The revised schedule, not to be confused with the Ford production plan outlined in this column Oct. 14, calls for 355,500 sets of parts for passenger cars and 100,000

trucks, bringing the total to 455,000. The split-up calls for approximately 2½ large cars to each 60 hp. car, 9000 small commercial cars, 36,000 large commercial cars (85 hp.) and 55,000 trucks.

Output Possible at Bottom

Automobile output, nationally influenced by the Thanksgiving holiday, appears to have dropped over a cliff but there seems now to be solid footing and a real bottom. December weekly totals should be above the level of the past week, which was 58,955 units, according to Ward's Automotive Reports. The previous week had seen the production of 85,757 cars and trucks in the United States and Canada, compared with 102,399 a year ago. The holiday brought the industry generally down to a three-day week. For some time to come, plants will probably operate on a four-day basis, but the leaders of the industry are beginning to "look up" and make plans for the spring.

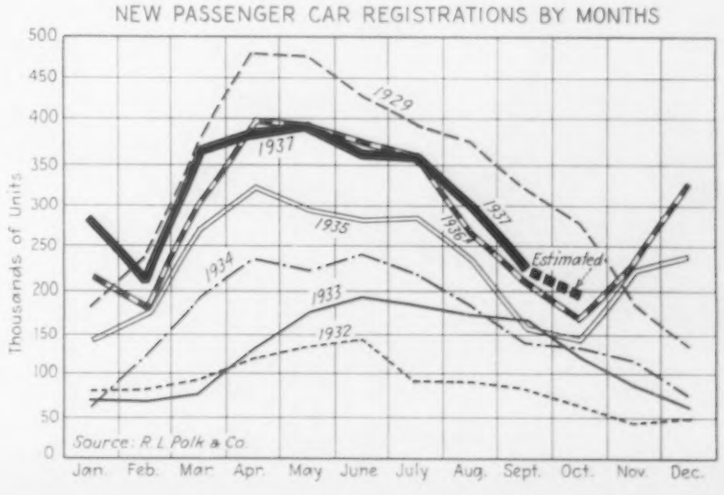
Further analysis of automobile registration makes it appear that the worst fears of recent weeks were not justified. Coming in slowly, registration figures now available for 39 states show 154,836 cars registered in October, according to the R. L. Polk & Co. This is approximately 17 per cent above last October. The accompanying chart shows that for the year only April and June have been bad points, sinking below 1936.

Retail Sales Improve

The preliminary adjusted index figures of the value of retail sales of new passenger automobiles increased sharply from September to October, according to the Bureau of Foreign and Domestic Commerce, Department of Commerce. This index, which makes allowance for the number of days as well as for seasonal movements, was 124.0 in October on the basis of 1929-1931 average of 100, compared with 105.0 in September and 120.5 in August. Buick supplies figures on its November sales showing that 6776 new cars were delivered at retail in the United States in the first 10 days, exceeding the best volume for this period in Buick history. This compared with 4740 cars retailed during the first 10 days of the preceding month, a gain of 42.9 per cent, and with 5048 cars in the corresponding period of November, 1936, a gain of 34.2 per cent. As a result of its success in the sales field, output at the Buick factories in Flint and in assembly plants in Linden, N. J., and Los Angeles were at a rate of more than 1200 a day, representing a substantial increase in original November production schedules. According to W. F. Hufstader, general sales manager, unfilled orders at the factory and in the hands of dealers are sufficient to maintain this high production schedule through the rest of the year.

An important feature of the car marketing problem is the movement of used car stocks, which depends to a large extent on purchasing power of the lower income group. At present the condition is not as good as last spring, when inventory showed stocks representing only a 29-day supply in many cases. According to Buick figures, there is now a 36.9-day supply.

Probably because of unsettled conditions, two important indus-



trial property options have been allowed to lapse, indicating the temporary abandonment of industrial development programs. An option held for six years by the American Rolling Mill Co. on 200 acres in Trenton, down-river from Detroit, was allowed to expire Oct. 15, it has been learned. Some money had been spent on the site for investigations of the underground conditions. The Thornton Tandem Co. of Detroit, which converts four-wheel trucks into the six-wheel type and manufactures a gear unit for truck transmissions, has allowed its option to lapse on a 25-acre site in Warren Township, Macomb County, north of Detroit.

However, down-river activity continues with the purchase recently by the Pennsylvania Salt Co. of Wyandotte, Mich., of 10 acres between its present holdings and the new site of the Firestone Steel Products Corp., which has a plant under construction.

Labor Developments

Business and union heads have been able to find little import in the statement issued the day before Thanksgiving by Governor Murphy on sitdown strikes. He repeated views he had expressed earlier about strikes being unnecessary and again urged on management and workers a greater sense of responsibility. He did concede that our difficulties then — during last winter's crises—"were due largely to lack of effective organization and definite Governmental authority to deal with labor disputes."

Observers found it hard, however, to find any good reason for his making the statement since it contained no warning, no new policy and only a weakly worded suggestion that business needs stability now to avoid further curtailment of operations and buying.

The UAW, having eased the Pontiac situation by putting an end to the sitdown there, continued to move resolutely toward complete domination of the situation. In a disciplinary move Sunday, Homer Martin, president, placed the Pontiac Local No. 159 under direct control of the international board. Charles Madden, regional director of the union, was named one-man dictator of the affairs of the local to operate somewhat in the manner of the four-man group set up by Martin in Flint after factional differences there threatened the union. Conferences with the Fisher Body plant management at Pontiac were resumed Monday. For the first time the union has said openly that strikes in feeder plants, which supply parts for Ford cars, will be used in the battle to organize the 140,000 Ford employees. Richard T. Frankensteen declared Sunday that "we have 10 ways in which we can close Ford completely," referring to the St. Louis strike. He indicated that he referred to closing such plants as Kelsey-Hayes, Midland Steel and Briggs. This is an elaboration of the CIO plan to pit its "economic force" against Ford as outlined in this column last Oct. 21.

Curtailed income of the United Automobile Workers Union will force further reductions in the International's staff and abandonment of the medical research institute as an international project, it was reported today. Notified by the International that it is withdrawing support from the institute, the Detroit District Council of the UAW has appointed a committee to investigate the possibility of the institute being financed by Detroit unions. Income of the international union has been decreasing in recent weeks, especially because of the layoffs of tens of thousands of auto workers. The union members are not required to pay the dollar a month dues during periods when they are not employed.

FIRST official photographs of the new Ford cars were released this week at the time of the public showing. Previously only hood and grille pictures had been shown and a few of the cars were displayed at principal automobile shows. Car No. 1 will be the deluxe 85 hp. job. The front resembles the Lincoln Zephyr and sweeping lines on the rear quarter panel of the entirely new and longer body are also similar to the big sister car. The standard Ford line is powered with either the 85 or 60 hp. V-8 engine and is not greatly changed from last year's models, but has a new front end treatment. Besides having two distinct bodies and hood and grille differences, the cars have different front fenders. Examination of the cars reveals that the slots in the grille and louvers are formed entirely by stamping, with the ribs integral with the rest of the panel. Control knobs are recessed for safety. The two lines of cars are on the same V-8 chassis.

1938 DeLuxe Ford Tudor

1938 Standard Ford Tudor

Current Metal Working Activity Statistically Shown

These Data Are Assembled by The Iron Age from Recognized Sources and Are Changed Regularly as More Recent Figures Are Made Available. Bold Face Type Indicates Changes This Week.

	October, 1937	September, 1937	October, 1936	Ten Months, 1936	Ten Months, 1937
Raw Materials:					
Lake ore consumption (gross tons)[a]	4,203,873	5,157,411	4,384,908	35,818,890	49,344,994
Coke production (net tons)[b]	4,262,946	4,679,875	4,299,900	37,395,300	45,999,617
Pig Iron:					
Pig iron output—monthly (gross tons)[c]	2,892,629	3,410,371	2,991,887	24,556,395	33,114,269
Pig iron output—daily (gross tons)[c]	93,311	113,679	95,512	80,513	108,928
Castings:					
Malleable castings—production (net tons)[d]	42,953	52,728	51,778	459,088	542,037
Malleable castings—orders (net tons)[d]	34,810	41,662	55,521	451,147	362,260
Steel castings—production (net tons)[d]	.....	83,047	74,775	653,202	.....
Steel castings—orders (net tons)[d]	.....	57,414	59,431	673,256	.....
Steel Ingots:					
Steel ingot production—monthly (gross tons)[e]	3,392,691	4,301,869	4,534,246	38,060,388	45,891,460
Steel ingot production—weekly average (gross tons)[e]	765,844	1,005,110	1,023,532	873,546	1,056,676
Steel ingot production—per cent of capacity[e]	58.31	76.52	78.15	66.69	80.67
Finished Steel:					
Trackwork shipments (net tons)[a]	6,137	8,101	5,547	58,478	84,028
Fabricated shape orders (net tons)[g]	46,912	132,432	130,989	1,320,867	1,381,381
Fabricated shape shipments (net tons)[g]	149,308	163,541	156,717	1,292,315	1,415,403
Fabricated plate orders (net tons)[d]	31,942	31,484	33,791	392,554	373,914
U. S. Steel Corpn. shipments (tons)[h]	792,310	1,047,962	1,007,417	8,875,124	11,749,156
Ohio River steel shipments (net tons)[i]	89,750	122,600	145,065	930,446	1,097,395
Fabricated Products:					
Automobile production, U. S. and Canada[k]	369,193	175,620	264,495	4,148,857	5,040,060
Construction contracts, 37 Eastern States[l]	$202,080,900	$207,071,800	$225,767,900	$2,267,396,100	$2,509,095,200
Steel barrel shipments (number)[d]	938,443	725,699	924,797	6,971,797	8,476,910
Steel furniture shipments (dollars)[d]	$1,918,428	$2,083,919	$1,776,784	$15,487,337	$21,806,863
Steel boiler orders (sq. ft.)[d]	611,720	661,372	968,845	8,701,981	8,623,644
Locomotive orders (number)[m]	0	8	22	180	**278**
Freight car orders (number)[m]	21	1,195	1,310	38,664	47,826
Machine tool index[n]	152.0	210.7	136.5	†127.5	†180.8
Foundry equipment index[o]	185.2	231.8	173.8	†160.4	224.6
Foreign Trade:					
Total iron and steel imports (gross tons)[p]	.....	37,071	64,509	552,275	.....
Imports of pig iron (gross tons)[p]	.....	7,911	7,264	144,871	.....
Imports of all rolled steel (gross tons)[p]	.....	13,796	29,730	229,970	.....
Total iron and steel exports (gross tons)[p]	.....	542,740	261,882	2,714,817	.....
Exports of all rolled steel (gross tons)[p]	.....	213,990	132,434	922,435	.....
Exports of finished steel (gross tons)[p]	.....	173,902	110,886	826,970	.....
Exports of scrap (gross tons)[p]	.....	252,713	119,568	1,704,723	.....
British Production:					
British pig iron production (gross tons)[r]	769,600	726,600	670,300	6,367,100	6,929,100
British steel ingot production (gross tons)[r]	1,133,600	1,163,000	1,060,500	9,678,500	10,681,900
Non-Ferrous Metals:					
Lead production (net tons)[s]	49,197	41,046	42,156	372,271	436,838
Lead shipments (net tons)[s]	39,292	53,850	59,210	411,016	508,060
Zinc production (net tons)[t]	52,645	50,027	46,225	430,556	488.752
Zinc shipments (net tons)[t]	40,345	47,737	53,963	445,570	507,890
Deliveries of tin (gross tons)[v]	8,210	8,245	6,005	61,730	73,450
Copper production, refined (net tons)[w]	86,811	90,982	72,895	601,125	827,704

†Three months' average. *Preliminary.

Source of figures: [a] Lake Superior Iron Ore Association; [b] Bureau of Mines; [c] THE IRON AGE; [d] Bureau of the Census; [e] American Iron and Steel Institute; [g] American Institute of Steel Construction; [h] United States Steel Corp.; [i] United States Engineer, Pittsburgh; [k] When preliminary from Automobile Manufacturers Association—Final figures from Bureau of Census. [l] F. W. Dodge Corp.; [m] *Railway Age;* [n] National Machine Tool Builders Association; [o] Foundry Equipment Manufacturers Association; [p] Department of Commerce; [r] British Iron and Steel Federation; [s] American Bureau of Metal Statistics; [t] American Zinc Institute, Inc.; [v] New York Commodities Exchange; [w] Copper Institute.

THE IRON AGE Weekly Index of Capital Goods Activity

(1925-27 = 100)

Weed ended Nov. 27	58.9	Same week 1934	43.4
Preceding week	61.6	Same week 1933	47.3
Same week last month	75.8	Same week 1932	35.2
Same week 1936	95.2	Same week 1931	51.7
Same week 1935	72.1	Same week 1930	78.2
Same week 1929	97.4		

WEIGHTED down by an unusually sharp drop in automobile assemblies, THE IRON AGE seasonally adjusted index of capital goods activity declined 2.7 points in the week ended Nov. 27 and now stands at 58.9 per cent of the base average. The loss in automobile assemblies, after compensating for the holiday, was 10.9 points, and the index of this component now stands at 58.5 per cent of the 1929 average. The loss in the steel ingot series was the smallest since the decline began in September, and the adjusted index figure for this factor stands at 39.9, or 1.6 points below the previous week's position. Revenue freight carloadings of forest products dropped 702 cars, but as this loss was less than the seasonal decline, the final index figure rose 0.2 points. A contract for the Kensico shafts of the Delaware Aqueduct in Putnam County, New York, totaling $33,944,000, was instrumental in lifting the dollar volume of heavy construction awards to the third highest figure of the year and advanced the index number of this component 3.7 points above the preceding week's level. Activity in the Pittsburgh district continued to decline, a loss of 2.6 points being indicated.

	Latest Week	Change from Preceding Week
Steel production (per cent of capacity)	33.0	—2.0
Automobile production (number of cars and trucks)	58,955	—26,802
Railroad loadings of forest products (number of cars)	26,805	—702
Pittsburgh industrial production and shipments (index number)	64.7	—2.6
Construction contracts awarded (total value)	$72,481,000	+$37,728,000

Components of The Index (1) Steel Ingot Production Rate, from THE IRON AGE; (2) Automobile Production, from Ward's Automotive Reports; (3) Revenue Freight Carloadings of Forest Products, from Association of American Railroads; (4) Industrial Productive Activity in Pittsburgh District from Bureau of Business Research of University of Pittsburgh; (5) Heavy Construction Contract Awards, from *Engineering News-Record*.

WASHINGTON. . . . . .

. . . President confers with heads of public utilities to encourage building program.

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. . . House committee moves toward tax revision but no action will be taken before January.

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. . . Congress uneasy over business recession but legislation will not be hurried.

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. . . President's worries include prices; says steel and cement have not declined.

o o o

By L. W. MOFFETT
Resident Washington Editor
The Iron Age

o o o

WASHINGTON, Nov. 30.—The press conference President Roosevelt held last Tuesday was the first one since an aching tooth sent him to his room in the White House upon orders of his physician, Dr. Ross McIntire. The White House physician, unique in his power to dictate Presidential conduct, denied the President the right or privilege, if either, of holding his regular confab with the press. So instead of engaging in "matching wits" with 150 correspondents in the buzzing atmosphere of his ample Executive offices, sea-flavored by paintings and models of ships, the President held forth with 10 selected correspondents in the quiet precincts of his tastefully arranged oval-shaped study in the Executive Mansion.

Acting as a press "relations" committee for their less fortunate waiting colleagues, the chosen faithful 10 brought good tidings from their fireside chat with the President. Foremost was the cheering word that the President, sans the painsmaking tooth, was himself again. The President was reported to be the picture of robust health and in high good humor. He really could have easily conducted his ever-moral, full-sized press conference except for the rigid restrictions of a most solicitous doctor. Devastating was the report to variant idle tales of wags. There was the crusted gag that the President had broken a tooth biting off more than he could chew. Then there was the doubtful wisecrack that the President had gone through the pangs of cutting a wisdom tooth. Persiflage, of course. The President simply had a thumping molar and suffered slight internal disorder. The molar and the accompanying mild ailment gone, the President was once more in tip-top shape, both serious and chipper at the interview, as verified by the transcript which was furnished the press. When the President resumed his full-sized press conferences last Friday the regular multitude of Washington correspondents who attended saw clearly that the report on the good health of the President was entirely accurate. To polish off recuperation the President departed on Saturday for a nine-day Florida fishing trip.

Serious, and perhaps suffering from a figurative headache, along with the country generally, because of the business nose dive, the President told at the Tuesday press conference of a 90-minute huddle he had held that day with President Wendell L. Willkie of the Commonwealth & Southern Corp., and Chairman Frank R. McNinch of the Federal Power Commission. This move was conditionally designed on the "prudent investment" idea to release the public utility from the New Deal doghouse. And to see what it could or would do to remove the headache by going into the market for some $1,500,000,000 to coax prosperity from around the corner. Evidencing a further face-about attitude, this drag on the pipe of peace the New Deal is smoking with the "princes of privilege," was one of a series of conferences held with public utility and other industries since the recent stock market crash with the accompanying recession in business.

The Willkie conference was followed by one on the ensuing day with Floyd L. Carlisle, chairman of the Consolidated Edison Co. and the Niagara Hudson Co., which also lasted 90 minutes and brought from Mr. Carlisle the statement that he was going to take up immediately the possibilities of expanding facilities of

GLEAMING=

with the

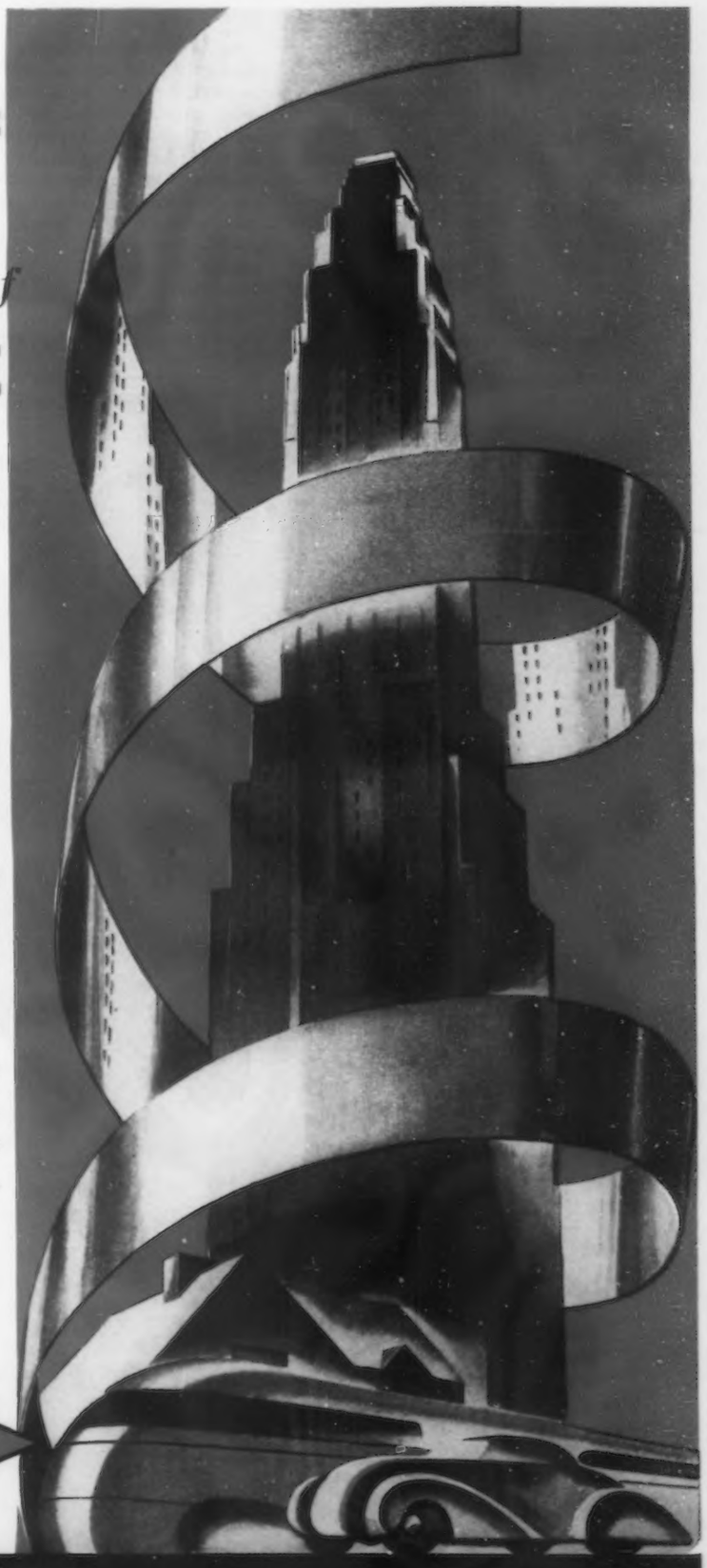
ASSURANCE *of* PERMANENCE

A product that gleams and sparkles with freshness is not only good to look upon, but it carries a suggestion of cleanliness. Buyers have indicated a preference for that type of product—particularly when the gleam carries a definite assurance of permanence.

Manufacturers can give this assurance—and many are doing so—with SUPERIOR Stainless Strip.

SUPERIOR Stainless is backed by 50 years' experience in the manufacture of Hot and Cold Rolled Strip Steels. Ahead lies our determination to render the best possible service to users of stainless and carbon strip steel. Improvement of our product is our watchword. Improvement of your product is possible through the use of SUPERIOR Strip.

Let our engineers tell you how!



Superior STAINLESS STRIP Steels

SUPERIOR STEEL CORPORATION

GENERAL OFFICE: GRANT BLDG., PITTSBURGH, PA. WORKS: CARNEGIE, PA.

his companies "all along the line." He predicted the cost of such a program would be from $100,000,000 to $112,000,000 over the next two years. Mr. Carlisle said he had "a very happy discussion" with the President and that he believed "the fears of Government competition with public utilities have been very much lessened as a result of the White House conferences."

These conferences are reminded of like conferences with business men which President Hoover hastily called after the 1929 stock market crash. Mr. Hoover also was given pledges by railroads and other important buying units to make large expenditures and to maintain employment and wages. At that time, however, there was not present the jittery feeling which now prevails in the public utility industry over Government competition.

Production and employment sliding downward rapidly efforts are being made to head off what anti-New Dealers call the Roosevelt depression. No time for political horseplay, New Deal or anti-New Deal, an anxious country is hoping the President's cheerful prediction of an early upswing in business proves to be well taken. Above all it wants confidence which manifestly calls for an end to business heckling, socialistic legislation and fulfillment of the pledges to aid, not obstruct, legitimate enterprise.

Congress Uneasy Over Depression In Business

Running along with the hurried turn-to-the-right White House moves (to induce large-scale heavy construction and equipment purchases by the public utilities and an ambitious housing program, privately financed), an uneasy Congress, hearing loudly from business and labor constituents, is swept with a tax-revision tide. So strong is the demand quickly to loosen industry from the tight chain of the surplus destroying undistributed profits tax, that the Administration may find it difficult to prevent action at the present special session. The Administration, apparently, giving ear to left-wing advice, hitherto has been adamant against revision of the undistributed profits and capital gains tax but under nation-wide public pressure has acceded to revision. At his Friday press conference the President declined to say whether he expected action at the special or regular session.

But any hope of tax revision at the special session was, short of a revolt in Congress, laid at rest Saturday when after a conference with the President, Senator Barkley, majority leader, said definitely that there will be no tax revision during the special session.

Asked specifically about his attitude on tax revision, including so-called "cushions" for the undistributed profits tax, the President suggested that newsmen again read his recent message to Congress and listed revision as one of the things he wants done just as soon as Congress is ready to do it. He indicated, however, that he preferred not to have the remedial legislation bear the stigma of being "undigested legislation" —a label he said was usually given by critics to hurried legislation.

House Committee Working Toward Tax Relief

While the President was saying distinct progress was being made toward reconciling differences between the public utility industry and the Administration, after

talking with Mr. Willkie, and as he pushed ahead with the private housing program, a subcommittee of the House Committee on Ways and Means voted tentatively to recommend to the regular session for tax relief and this move stimulated action by the more aggressive for enactment of revision at the extra session, even if the Presidential program itself was reduced to a secondary position. The House Ways and Means subcommittee, headed by Representative Fred M. Vinson of Kentucky, is said to have been given White House and Treasury approval in proposing exemption from the undistributed profits tax of all corporations with annual incomes of $25,000 or less; substitution of a higher normal corporation income tax rate and relaxation of provisions of undistributed profits tax affecting corporations of larger incomes.

Representative Vinson said the revision would be particularly helpful to hardship cases—to corporations in need of funds for debt retirement, plant expansion, repair of capital structures and other necessities.

Under the tentative plan corporations with net incomes of $25,000 or less would pay a normal tax of 12½ per cent up to $5000 and 14 per cent on the next $20,000. It was stated that the exemption would affect 176,000, or 88 per cent of the country's corporate interests. The committee plan proposes a graduated tax of from 16 to 20 per cent—knocked down from the present 27 per cent maximum—on corporations with incomes above $25,000 depending on the percentage distributed.

How Rates Would Work

Chairman Doughton of the Ways and Means Committee said the changes would "remove the objection that the larger corporations are paying excessively high rates, because the highest they can pay is 20 per cent."

Explaining how these proposed new rates would work, Representative Vinson pointed out that a company with an income above $25,000 would pay 19.6 per cent on its adjusted net income if it distributed 10 per cent of its profits; 19.2 per cent if it distributed 20 per cent; 18.8 per cent if it distributed 30 per cent; 18.4 per cent and so on to a payment of 16 per cent if the entire income were distributed.

Mr. Vinson said it is estimated that, if one normal corporation rate were to be applied, that rate, to raise the same amount of revenue, would have to be more than 22 per cent.

Despite Administration gestures of peace toward industry there are skeptics who fear that the Presidential club has been kept near at hand for later use. They suspect that the second "era of good feeling" will bust just as it did after its short life following the President's reelection one year ago. They doubt that the New Deal's dislike of industry has been softened at all and feel that the

cry for cooperation with business is only temporary, growing out of distress and political expediency. These skeptics affected to see Administration dislike displayed by release at the White House of the voluminous report of the New York State Power Authority bitterly attacking certain Eastern power interests and policies. This report was given out while the President was in conference with Mr. Willkie. The White House, however, denied that the release of the New York Power Authority was timed with the Willkie conference.

President Worrying Over Prices

Regardless of this attitude of skepticism, Washington at both ends of Pennsylvania Avenue—at the Capitol and at the White House—is hearing from a country in full cry for cooperation between the Government and industry to stem the tide of declining business and to restore recovery. And the President said that he, Mr. Willkie and Mr. McNinch had conferred with considerable success toward laying the basis for a $1,500,000,000 building program by the public utilities. Apparently the President sought to impress on Mr. Willkie that the Government is not a real, formidable competitor of private utilities in the power field. And also Mr. Willkie was quoted as saying, in connection with criticism of so-called over-capitalization of public utilities, that he would be willing to have the write-ups as found by the Federal Trade Commission struck wholly from the capital structures of the utilities in establishing valuation for rate-making purposes. Mr. McNinch said that the FTC had disclosed a write-up of between $1,250,000,000 and $1,500,000,000 in its survey which covered from 68 to 70 per cent of the $12,000,000,000 invested in private utilities.

The President's worries also include prices. He thinks durable goods prices are too high. Asked if he had noted any reduction in prices, the President said he had noted a definite reduction in prices of lumber but not in cement and steel.

PRESIDENT HITS AT PRICES OF STEEL AND CEMENT

WASHINGTON, Nov. 30—President Roosevelt hit directly at the pricing policies of the cement industry—and indirectly at those of the steel industry—last week and inferred that both industries are lacking in competition.

He told a press conference that price maintenance in the cement industry, against which he cryptically said there has been a great deal of complaint, was not the result of agreement but of "hypnosis."

Asked about present price trends in connection with the Administration's plan to stimulate private enterprise through a large-scale building program, Mr. Roosevelt said that the latest information furnished him showed that prices on steel and cement had not gone down.

There is competition in lumber, the President added, and lumber prices have taken a very definite drop.

70-Car Train Bill Action Postponed

WASHINGTON, Nov. 30.—Congressman Lea, Democrat, of California, chairman of the House Interstate and Foreign Commerce Committee, announced last week that railroad carriers and labor brotherhood representatives had agreed to postpone consideration of the controversial McCarran train limit bill until Jan. 11, at which time the committee is scheduled to begin hearings on the measure.

The McCarran bill, which would limit the length of freight trains to 70 cars, already has passed the Senate and was suggested by its sponsor, Senator Pat McCarran, Democrat, of Nevada, primarily as a safety measure on the ground that longer trains are a menace to crew safety.

The railroads have characterized the bill as a "make work" scheme in disguise advanced for the benefit of unemployed railmen and point out that it would add from $90,000,000 to $125,000,000 a year to operating costs. Instead of being a safety measure, the railroads hold that the limitation actually would add to the danger involving both railroad workers and motorists at grade crossings.

Union spokesmen told the Senate Interstate Commerce Committee during hearings last session that trains of more than 70 cars are hazardous to both conductors and flagmen, interfere with safe hand signaling and result in both motor and pedestrian traffic delays. Testimony before the committee showed that trains of 160 cars are not uncommon.

NLRB Certifies AFL, CIO For General Castings

WASHINGTON, Nov. 30.—The National Labor Relations Board has recognized three AFL craft unions and the CIO steel workers' union as the workers' choice of collective bargaining representatives at the General Steel Castings Corp. Commonwealth Division plant, Granite City, Ill. The NLRB certification followed an election held Oct. 29 at which the CIO union did not participate since the board already had certified its membership by checking union cards against company payrolls.

The three craft groups, which include the International Association of Machinists, the Pattern Makers Association of St. Louis, and the International Brotherhood of Boilermakers, Iron Shipbuilders, Welders and Helpers of America, embrace 450 out of the plant's 2,450 employees. The Amalgamated Association of Iron, Steel and Tin Workers of America, the CIO group, was certified as representing all the production and maintenance workers.

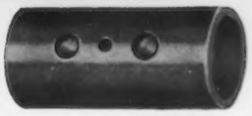
Scrap Brass Radiators Rate Advance Refused

WASHINGTON, Nov. 30.—The United States Maritime Commission has declined to suspend the proposed rate of 70c. per 100 lb., minimum weight 24,000 lb., on scrap brass radiators from Pacific Coast to Atlantic Coast ports. The rate became effective Nov. 22, and is slightly lower than the rate on scrap brass when shipped loose.

New Officers Elected By Michigan Scrap Dealers

NEW officers of the Michigan chapter of the Institute of Scrap Iron and Steel are Ben Kramer, president; Harry Goldman, vice-president; Milton Mahler, secretary and Abe Kasle, treasurer. Members of the executive board are H. W. Smith, H. A. Fisher of Muskegon, Morris Birnbaum of Wyandotte, E. D. Spector and J. Varkle.

DIESEL BLOCKS

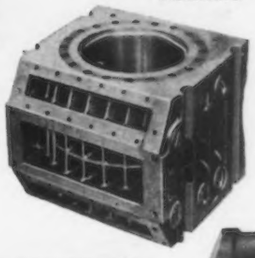


BUSHING

VALVE LINER

HOOK
TO DIP REELS OF WIRE INTO MOLTEN BATH

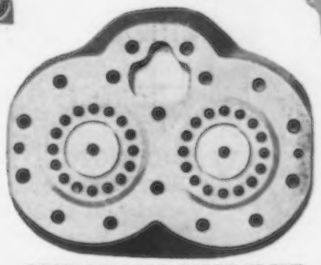
STOKER LINK



DIESEL PISTON

CRANKSHAFTS

BUBBLE CAP
OIL STILL

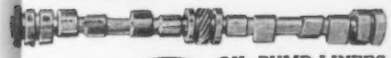


REFRIGERATOR VALVE PLATE

VALVES

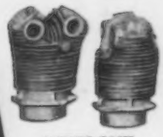
TAPPETS

CAMSHAFT



OIL PUMP LINERS

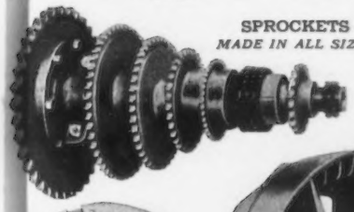
LOCOMOTIVE BOXES



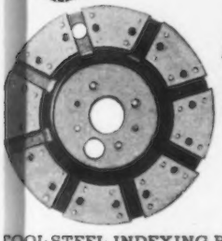
AIRPLANE CYLINDERS

DIESEL ENGINE MANIFOLD

SPROCKETS
MADE IN ALL SIZES



END LINERS *FOR BALL MILL*



TOOL STEEL INDEXING PLATES
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COFFEE MILL BURRS

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FLAME HARDENED

BARREL FEED CAMS
FOR AUTOMATIC DRILLING MACHINES FORMERLY TOOL STEEL

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The Cincinnati Milling Machine Co. ..... Cincinnati, Ohio
Cooper Bessemer Corporation ..... Mt. Vernon, Ohio
Crawford & Doherty Foundry Co. ..... Portland, Oregon
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Kinney Iron Works ..... Los Angeles, Calif.
Koehring Company ..... Milwaukee, Wis.
Michigan Valve & Foundry Co. ..... Detroit, Mich.
Rosedale Foundry & Machine Co. ..... Pittsburgh, Pa.
Ross-Meehan Foundries ..... Chattanooga, Tenn.
Vulcan Foundry Company ..... Oakland, Calif.
Warren Foundry & Pipe Corporation ..... Phillipsburg, N. J.
Washington Iron Works ..... Seattle, Washington

Chamber Votes 7-Point Program To Hasten U. S. House Building

WASHINGTON, Nov. 30.—Buoyed by hopes for Governmental stimulation of a private industry construction boom but warning against any "undue intrusion of Governmental agencies into the field of private enterprise in construction," the United States Chamber of Commerce housing conference recently voted a seven-point program for action and discounted the contention that building costs are too high.

Considering additional comforts and conveniences of new homes, "the buying public are receiving more for the building dollar than they received before," a committee report said.

The committee expressed concern over effects of labor disputes, jurisdictional controversies and sympathetic strikes and warned that assurance must be given the buying public that projects once started will not be delayed by circumstances in "disassociated and non-connected enterprises."

Attributing part of the bogging down of the construction industry to the undistributed profits tax, the conference report declared operation of the tax has "seriously affected plant expansion, modernization, the purchase of equipment and retarded residential construction." It recommended:

1. Market surveys showing demand for residential construction throughout the country because of "a definite variance of opinion as to the number of units needed nationally and locally";

2. Investigation of economies in small houses for those in the lower income brackets to determine "a reasonable allocation of total cost by percentages to the various elements."

3. Study the absolescence of buildings in already-developed residential areas with the view of encouraging the modernization of old buildings.

The two-day session was attended by representatives of the Government, real estate interests, building supply dealers, building material and equipment manufacturers, contractors, home financing institutions, architects and other industries.

Meanwhile, there were reports that the RFC is ready to aid the President's private housing program by matching dollars with private interests in subscribing capital for national mortgage associations. Presumably, these organizations would construct large housing units and buy mortgages to loosen capital already invested in real estate.

Under an almost identical offer made last year by RFC Chairman Jesse Jones, but which was never accepted because of technicalities in the law authorizing the chartering of such groups, borrowing could have been done by public sale of bonds and debentures, guaranteed as to principal and 3 per cent interest by the FHA.

Steel Wage Rate Exceeded Only by Oil Refining Industry

WASHINGTON, Nov. 30.—Exceeded only by the petroleum refining industry, with a rate of 61.1c., the iron and steel industry paid an average hourly entrance wage rate of 58.5c. in July of the present year, according to a survey of 20 industries made by the Bureau of Labor Statistics. The Northern iron and steel rate was 59.5c. and the Southern rate was 53.4c. Only 0.9 per cent of the common laborers in the industry received less than 40c. per hr. In the North only 0.4 per cent received less than that rate while in the South 3.4 per cent were below the 40c. scale.

These figures are taken from the 12th annual common-labor survey which will shortly be released by the bureau. They cover 5238 establishments in the industries covered with 222,555 common unskilled laborers on their payrolls at entrance rates.

Four other industries, aside from iron and steel, averaged hourly entrance rates ranging between 55c. and 60c. They were: slaughtering and meat packing, 56.7c.; automobile parts, 55.4c.; building construction, 55.3c.; and paints and varnishes, 55.2c. The entrance rate for foundry and machine shop products was 49.6c. The average hourly entrance rate in the 20 industries was 51.2c.

Export Inquiries for a Variety of Equipment

WASHINGTON, Nov. 30.—Glass-lined steel vats of 22,000-gal. capacity have been inquired for from Canada; concrete mixers of American manufacture are wanted in England; and Peru is in the market for mine-drilling equipment, according to reports made by American envoys in foreign lands and listed in the current issue of Commerce Reports. Plows, internal combustion engines, feather washing machinery, hosiery manufacturing machinery, and sewing machines are included among the many other articles inquired for from abroad.

Detailed information concerning the trade opportunities in the possession of the Bureau of Foreign and Domestic Commerce are available to American firms and individuals and may be had upon application to Washington or any district branch of the Bureau centrally located throughout the United States.

ADDITIONAL WASHINGTON NEWS ON PAGE 87

Homestead Valve Mfg. Co., Inc., Coraopolis, Pa., has appointed the following representatives to sell Homestead quarter turn, lift-plug, boiler blow-off and protected seat hydraulic operating valves: Charles A. Randorf, 220 Delaware Avenue, Buffalo; Beeler-MacWilliams, Inc., 1002 Hills Building, Syracuse, N. Y.; W. E. Mushot Co., 311 S.W. Front Avenue, Portland, Ore.; Clowe & Cowan, Inc., 401 Harrison Street, Amarillo, Tex.; Paul R. Winston Co., 206 Construction Building, Dallas, Tex.; Waterworks Equipment Co., 149 West Second South Street, Salt Lake City, Utah; Tazewell Buchanan, 2629 Grace Street, Richmond, Va.

. . PERSONALS . .

PHIL HUBER, vice-president and assistant general manager of Ex-Cell-O Corp., and one of its original organizers in 1919, has been elected president and general manager. He succeeds N. A. WOODWORTH, who has resigned because of ill-health. H. G. BIXBY, assistant secretary since 1929, controller since 1932, has been elected secretary, treasurer and a director. Mr. Huber, successively chief inspector, factory superintendent, vice-president and assistant general manager, has been prominently associated with the growth of the company, now one of the largest in the manufacture of precision parts and precision machine tools, supplying the automotive, railroad, household appliance, agricultural and aircraft industries. He has been responsible for the major machine tool and equipment developments of the company, notably the precision boring machine and thread grinder.

P. HUBER

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L. W. WALLACE, head of engineering research for the Association of American Railroads, has been made a director, effective Dec. 1, of the newly organized division of engineering and research of the Crane Co., Chicago. The new Crane division will comprise the existing division of research and development and the product engineering department of the company.

"The new division has been formed to coordinate all engineering activities of the company," said C. B. Nolte, president, "and to further its progress in diversified fields. The importance and growth of this technical work has proved the advisability of maintaining a complete and well-staffed engineering division, free from all responsibilities except those relating to engineering, research, design and experimental work."

Mr. Wallace, who will be directly responsible to Mr. Nolte, will direct the originating of new lines of products, the development of inventions and patents and the maintenance and improvement, if possible, of existing Crane products. These activities will include the operation of chemical, metallurgical, oil, steam, air, hydraulic, heating, plumbing and other research laboratories. The enlargement of the laboratories and the installation of new laboratory equipment are about completed.

having been in progress for some time.

Mr. Wallace has been director of engineering research for the Association of American Railroads

L. W. WALLACE

for the past three years. During this time he built up an engineering research organization which performed important work in the fields of air-conditioning of passenger cars, lightweight freight car construction, diesel-electric train operation and many phases of locomotive design and construction including a proposed steam-turbine, direct drive, condensing locomotive. As a consulting engineer, he has conducted extensive research for railroads. He was previously connected with Purdue University, Diamond Chain & Mfg. Co., Indianapolis, and W. S. Lee Engineering Corp., Washington.

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HENRY C. ANDERSON, whose early experience was in the railroad business, has become dean of the College of Engineering of the University of Michigan by special action of the Board of Regents. He succeeds DEAN HERBERT C. SADLER, who has headed the college since 1928, but has retired from administrative duties because of poor health. Professor Anderson is the fourth dean of the college since 1895. After receiving his engineering degree from the University of Kentucky in 1897 and starting in the railroad business, he joined the University of Michigan faculty, rising to the head of his department in 1917. He also has done much consulting work on steam and electric railroads in the United States.

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MILTON M. OLANDER, personnel director of Owens-Illinois Glass Co., Toledo, Ohio, has been named vice-president of the National Association of Foremen. He will be general chairman of the committee arranging for the convention in 1938 in Akron.

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HAROLD E. LONG, vice-president of Nash Motors Co., Kenosha, Wis., in charge of purchases, and now vice-president of Nash-Kelvinator Corp., Detroit, has been appointed director of all purchases for all divisions of the corporation. His headquarters have recently been transferred from Kenosha to Detroit. Mr. Long was for nine years a buyer and later assistant purchasing agent of Buick Motor Co., under CHARLES W. NASH, with whom he has since been associated in purchasing capacities since Mr. Nash founded his automobile firm in Kenosha in 1916.

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FLOYD C. PARMAN, heretofore sales manager in the central New York territory, with headquarters

in Rochester, N. Y., for the Hendey Machine Co., Torrington, Conn., has been made sales manager of the Chicago district office. He is being succeeded at Rochester by E. J. RAY.

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CHARLES N. MASON, president of Electrical Securities Corp. and G. E. Employees Securities Corp., both wholly owned associated companies of the General Electric Co., Schenectady, N. Y., completed 50 years of service with General Electric on Nov. 1.

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NORTON MCKEAN, general superintendent of the American Meter Co., New York, and manager of its Albany, N. Y., plant, has been elected vice-president.

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EARLE E. BROWN, who represented the Continental Steel Corp., Kokomo, Ind., in California for many years, has been named district sales representative in Kansas and Nebraska and in Kansas City, Mo., with headquarters in Georgian Court Apartments, Kansas City.

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EDWARD W. VOSS has been appointed representative for the Philadelphia Drying Machinery Co., Philadelphia, in western Pennsylvania, eastern Ohio and West Virginia.

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W. E. WECHTER has been made manager of oil and gas engine sales, Atlantic Division, Worthington Pump & Machinery Corp., succeeding R. L. HOWES, who has resigned.

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WALTER H. BODLE, heretofore in charge of the Indianapolis office of the Square D. Co., Detroit, has been made assistant to C. L. HULL, sales manager. R. W. THOMPSON, who was previously branch manager for the company at Pittsburgh, succeeds Mr. Bodle in Indianapolis and is, in turn, being succeeded at Pittsburgh by A. W. ANDERSON.

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DR. G. M. L. SOMMERMAN, of the physical laboratory staff of the American Steel & Wire Co., Worcester, Mass., has received the Alfred Noble prize for "the best technical paper published by any member under 30 years of age of the American Society of Civil Engineers, American Society of Mechanical Engineers, the American Institute of Electrical Engineers or the American Institute of Mining and Metallurgical Engineers." The award was made on a paper entitled "Properties of Saturants for Paper-Insulated Cables."

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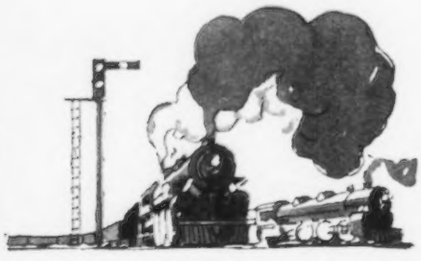
DAVID K. MILLER has been appointed district representative in charge of the Baltimore office of the Crucible Steel Co. of America, succeeding the late H. C. Ballord. R. C. JORDAN has been made manager of sales, Spaulding and Jennings mill products, with headquarters in New York.



...OBITUARY...

GEORGE HARGREAVES, prominent in Detroit industry since 1898, died Nov. 22 in Orlando Fla. Mr. Hargreaves, formerly treasurer of Parke, Davis & Co., Detroit, was born in England in 1851 and came to the United States in 1873. He was with the Santa Fe Railroad and later was purchasing agent for the Chicago, Burlington & Quincy Railroad. In 1898 he became associated with the old Michigan Peninsular Car Co. in Detroit. Later, when it was merged with the American Car & Foundry Co., he became district manager for the new organization. He was treasurer of Parke, Davis & Co. from 1905 to 1917, when he retired.

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ROBERT S. MACGARVIE, who had represented the Brown & Sharpe Co. of New York since 1925 in the metropolitan area, died on Nov. 26 after a long illness. He had been identified with the Brown & Sharpe organization for 22 years, having started his career as an apprentice machinist in the factory at Providence in 1915.

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EDWARD N. BOICE, treasurer of the Hanson-Van Winkle-Munning Co., Matawan, N. J., died on Nov. 6, aged 60 years. He had been associated with the company and its predecessors since 1892. Starting as an office boy with the Hanson & Van Winkle Co., he became bookkeeper in 1896 and purchasing agent four years later. He was made treasurer of the company in 1915. After the merger of Hanson & Van Winkle with the A. P. Munning Co. in 1927, he became secretary and served as sales manager of the new company for a short time. He continued as secretary until 1930, when he was made treasurer.

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JOHN A. SCHLEICHER, formerly in charge of design of sewing machine tools for the Brown & Sharpe Mfg. Co., Providence, and later associated with the Metropolitan Sewing Machine Co., Wales Adding Machine Co., and the Lufkin Rule Co., died recently in his 77th year.

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LUCIUS JAMES ELLIOTT, prominent industrialist of Racine, Wis., for more than a half century, died on Nov. 19, aged 82 years. He founded numerous metal trade and other industries, and at his death was president of the Imperial Bit & Snap Co., manufacturer of harness and other hardware specialties.

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PROF. EMORY D. ROBERTS, head of the civil engineering department, school of engineering, Marquette University, Milwaukee, died on Nov. 23, aged 47 years. He was graduated from Oregon State College in 1922 and specialized in reinforced concrete structures as well as suspension bridges and ocean terminals before and during his college career, joining the Marquette faculty in 1924.

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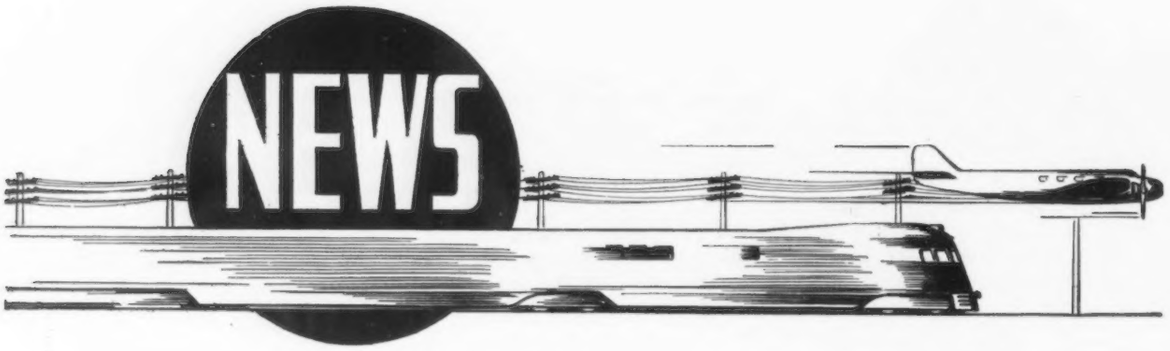
GERALD W. SMITH, a mechanical engineer employed by the Industrial Diamond Co., Detroit, died Nov. 25, following an operation. Mr. Smith, who was born in Ruthven, Ontario, had lived in Detroit for the last eight years. He was 41 years old.



Labor Relations in This Administration Founded on Basis of Conflict, Says E. T. Weir

ERNEST T. WEIR, chairman of the board of National Steel Corp., in an address Wednesday evening, Dec. 1, before the Economic Club of Chicago, at the Palmer House, Chicago, said that unsettled labor conditions prevail because the National Administration and leaders of organized labor have made "the false assumption that labor relations must be founded on a basis of conflict and, therefore, have shaped their action in the spirit and with the methods of war."

In another address delivered before the Cincinnati Chamber of Commerce at a luncheon at the Hotel Gibson, Cincinnati, on Tuesday, Nov. 30, Mr. Weir said Government intervention in business to some degree may be expected as a permanent feature of American life. He therefore advised that business men leave the sidelines and get into Government in order to help direct its economic activity into constructive channels.

In his Chicago address Mr. Weir pointed out that employee and employer are mutually dependent upon the unobstructed operation of industry for their livelihoods. He said:

"A sound basis for labor relations depends upon the direct opposite—the spirit and methods of peace. Whatever differences employers and employees may have between themselves, these differences are minor in the face of the fundamental economic necessity that they stand united in making their (industrial)

NEWS AND MARKET INDEX

The answer to a gaging or inspection problem may be immediately obvious to an experienced gage engineer or it may take considerable development work to determine the most economic solution.

Your gaging problem can be handled more readily by an organization such as Sheffield's because of its broad contact with all types of precision inspection and its record for leadership in gaging progress.

Sheffield pioneered domestically the beam of light in precision gaging . . . was the first to apply the Reed Mechanism to standard precision gages . . . the first to develop "precision machine lapping" for tapered gages in addition to straight plugs, and first in a number of other important developments. • Ask Sheffield about it first.

SHEFFIELD GAGE CORPORATION

Dayton, Ohio, U. S. A.

organization fulfill its essential purpose—that is, produce goods or services of a quality and at a price that society will accept. Society is the employer of the business organization, and it is a ruthless employer.

"The labor situation under the New Deal Administration," Mr. Weir stated, "has evoked different reactions from employers. The position taken by companies in the 'Little Steel' strike, however, is representative of that of many other employers," he said.

Danger in Complete Unionization

"Study of the position of these companies," he continued, "throws a clear light on management's viewpoint. First, because that viewpoint expresses no compromise in principle. It is directly opposite to the one held by the Administration and by leaders of organized labor. And second, because the issue in that strike was simple and clear. From beginning to end, the 'Little Steel' strike hinged on one question—the signing of a contract with the union."

Mr. Weir analyzed the reasons underlying the companies' refusal to sign a union contract. He emphasized the fact that the companies considered the Steel Workers Organizing Committee an "utterly irresponsible" organization, and that there was abundant proof before, during and after the strike that the great majority of the companies' employees did not want membership in this union.

The signing of a contract, the speaker contended, would have been the first step to the closed shop and the check-off. If the "Little Steel" companies had yielded, complete unionization, first of the steel industry and then of all industry, would have followed.

"We would have universal unionization in the United States, and with it, the concentration in the hands of a small group of labor-politicians of the greatest political power in the country—a power extremely dangerous in the hands of men who, with much less power, display an utter disregard for life, property, law or anything that stands between them and their ambition," he continued.

"There is abundant proof that improvement in wages, hours, working conditions and other professed union goals depends upon the economic character of an industry, not upon whether it is union or non-union. In 1936, the coal industry, which has been thoroughly unionized for years, paid a much lower annual average wage than a number of non-union industries. If all industry were unionized, the apparent gains of each would be neutralized by similar gains of all the others. As a result, real wages would be the same as now.

"Unionized industry could gain an advantage in only one way—that is, by forcing other groups, such as farmers, professional people, and white-collar workers, to pay an uneconomic price for the products of unionized industry. And undoubtedly this step would be taken. In self defense these other groups would then resort to collective action also. Almost inevitably there would be friction among groups that would force Government to step in and take complete charge of our whole economy. And that would be final proof that 'it *can* happen here'."

After describing conditions of violence and lawlessness that prevail during strikes, Mr. Weir urged that there must be labor legislation which will bear with equal justice upon all parties in labor relations

and remove the special exemptions now accorded to labor unions.

Control Over Labor Unions

Unions, he said, should be required to reorganize so that rank and file members could control policies and officers; should publish certified audits of accounts; should be prohibited from contributing to political campaign funds, and should be held responsible for the statements and acts of their agents. It should be illegal to call a strike without a prior vote of the employees in the plant involved, and in the event of a strike it should be illegal to transport pickets from other plants of industries.

Although it is not perfect in its present state of development, Mr. Weir said that the employees plan of representation affords a basis from which a satisfactory method of employer-employee relations may be evolved.

"The plan," he stated, "is right in principle because its purpose is to establish a basis for peace, its methods provide for cooperation, and its character adapts it to the structure of modern industry. With these great fundamental advantages in its favor, I see nothing to prevent the elimination of any drawbacks that it may have at present.

"The development of sound labor relations," the steel leader continued, "is limited by current conditions—which are founded on the theory of conflict and take their color from the bias and injustice in our law, in the action of the Administration, and from the self-seeking of labor leaders. While this continues there can be nothing more than a marking of time by employers and employees, the real parties in interest.

"Eventually the real workers of this country, with the support of public opinion, are going to have exactly the kind of labor relations they want," Mr. Weir said in conclusion. "If left to their own devices—free from the high-pressure influence of alien interests—I am confident that, in cooperation with employers, they will work out a system of employer-employee relations where the basis is harmony and understanding, not conflict. Then we will have industrial relations comparable to the efficiency and attainment of other phases of the American business system—beneficial to the employee, the employer, and the public."

Government Shaping Our Lives

In his Cincinnati address Mr. Weir suggested that business men use their influence to have our educational system in grade school through college place greater stress on training in political science because, "today politics and, through politics, Government is the most important of the influences shaping the environment" in which people must earn their living.

After briefly describing the conditions that prevailed a generation ago during the early days of his company and tracing the major events since then, Mr. Weir commented on the great changes that have occurred.

"One is bewildered if he attempts to analyze the diverse elements that have contributed to this change. The picture becomes clearer, however, if we confine our attention to the one basic change which is the product of the events of recent years and at the same time is the major cause of the unfamiliar, insecure and disturbing atmosphere in which we, as Americans, find ourselves today. This basic change is the enormous extension of governmental activity—what we might call "public business"—into every phase of economic life, and the rela-

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tive contraction of strictly private business. It is collectivism, growing and swallowing the individualism which we have always regarded as so typically American. The process has already gone so far that I believe you could hardly find a business enterprise anywhere in the United States which could be accurately described as private."

Scoring President Roosevelt's attacks on business leaders, Mr. Weir said: "Prior to the New Deal, the most extensive direct intervention of Government in business was during the World War. As to its principal objectives, it was successful and this success is often cited as a justification for similar attacks on problems of peace. The New Deal forgets that in the War, the Government focused the country's attention on a single objective, and furnished a leadership which all of the people could follow. Even before taking office, Mr. Roosevelt took the position that business leaders, and also wealthy people as a class, were his enemies, enemies of his program, and therefore, enemies of progress. He since has divided his Administration's energies between fighting this so-called class and fighting the depression. Perhaps Mr. Roosevelt's greatest mistake was in stirring up hatreds, fears and uncertainties which have discouraged the very people who could have given the most effective cooperation in any sound program designed to reach his professed objectives."

Business Men Should Enter Politics

The speaker urged business men to assume greater political responsibility. "Whatever business men may think about the superiority of private enterprise over government-regulated and controlled enterprise, the fact remains that today Government is in business," he pointed out. "More than that, history should teach us that no matter how quickly or on what pretext government assumes new power, it relinquishes them only slowly and reluctantly. Even should tomorrow bring a public reversal of feeling against government in business, the unscrambling process would be a matter of years. So there is nothing constructive in business men just lamenting the presence of government in business. Neither would there be any point—even should such action be desirable—in business men attempting a political frontal attack aimed to drive government from business.

"To my mind, the practical course is for business men to accept the fact that Government is in business and probably will be in business, to some degree, permanently. And then, on this basis, as good business men and as good citizens, set

about doing all within their power to shape the effect of Government upon economic activity so that it will work for and not against the great objective — which Government and business share—of higher living standards for America.

"How shall business men go about this? The answer is a simple one. Since Government is in business, business men must get into Government. This, of course, means that business men must get into politics. The old feeling, once widely held among business men, that politics is dirty or a waste of time, certainly has no validity now. Business and Government today are almost synonymous terms. In getting into politics, and therefore Government, the business man will simply be taking an active part in another phase of business."

The speaker said that business men should run for local, state and national offices, and pointed out: "It would not matter one way or the other which political party elected them. The important thing is that trained business viewpoints would be brought to bear on Governmental actions affecting economic activity. This now means the great majority of all governmental actions."

Education of Youth

In speaking on the need for more extensive education of youth in political and governmental matters, Mr. Weir said:

"Today young people start life with a knowledge of and attitude toward politics and government which are much inferior to their knowledge of or attitude toward their intended pursuits. The great majority, particularly among the so-called better classes, have no interest in the subject at all. Those who do have an interest base their action on tradition or emotion although they have been trained to minimize both of these in their particular life-works. As a result and year after year, issues are decided by slogans, and candidates who are not qualified for office are elected just because they are supported by a particular political party, or are popular public figures. This is a condition which must be changed, because today our democracy rests on a foundation of politics. Unless we have honest, intelligent, sound politics, our form of government—the best in all history —will be distorted beyond recognition as the government of a free people. The change will be achieved only through a basic change in the attitude and understanding of our electorate. We must start with the youth in our schools and we must start now."

Heald Co. Holds Sales Convention

INSPECTION tours of plants in the automotive area around Detroit featured the sales convention of more than 30 executives and sales engineers of the Heald Machine Co., Worcester, Mass., Nov. 19 to 22, at Detroit. Driven to Flint in a fleet of new Buick cars, the group spent the afternoon of Nov. 19 inspecting the various Buick manufacturing divisions. This was followed by a dinner at the Durant Hotel, Flint, at which 14 Buick manufacturing executives, headed by O. W. Young, general manufacturing manager, were guests.

The Heald engineers devoted considerable time to the inspection of equipment and layout in Buick's new automatic transmission plant, which is considered one of the outstanding examples of precision manufacture in the automobile industry. The head of General Motors proving ground, A. G. Schamehorn, addressed them Saturday night, and at a meeting held the next night, W. G. Peach, works manager, and Mr. Ford, master mechanic of the Wolseley Motors Ltd., Birmingham, England, were speakers. On Monday the group visited the Bower Roller Bearing plant and the Cadillac factory at Detroit.

HEALD MACHINE CO. engineers visit Buick automatic transmission plant during their convention at the Detroit Leland Hotel. Shown left to right are Mr. Vansaw, assistant superintendent, Buick plant No. 66; R. Wornock, superintendent plant No. 66; R. Fuller, Chicago office sales engineer, Heald Machine Co.; W. Erickson, New York representative; S. St. John, New England office; M. F. McCormick, manager, Chicago office; L. C. Kenyon, manager, New York office; F. H. Grimshaw, service manager; R. Fiedler, Cleveland office sales engineer; R. Lindberg, Chicago office sales engineer; E. A. Taylor, chief engineer; R. A. St. John, manager, Cleveland office; S. T. Massey, vice-president and sales manager; R. S. Heald, manager boring division; R. M. Lippard, manager, Detroit office; J. G. Hammond, general superintendent Buick; C. T. Guething, sales engineer main office; O. A. Johnson, sales engineer, Chicago office; F. C. Pyper, master mechanic, Buick; E. C. Barber, sales engineer, Cleveland office; Roger Heald, president and general manager, Heald; L. A. Hastings, advertising manager; D. C. Page, manager, grinding machine division.

Instrument Measures Nickel Thickess

THE local thickness of an electroplated nickel coating on a nonmagnetic base metal may be measured by a new instrument announced by the American Instrument Co., Silver Spring, Md.

The principle of the method involves the measurement of the force required to detach one pole of a permanent magnet from the nickel coating, and the comparison of this force with that required to detach the same magnet from a similar nickel coating of known thickness. The instrument is calibrated with nickel coatings of known thickness which have been deposited under about the same conditions as the coatings to be tested. Nickel coatings deposited under different conditions have somewhat different magnetic permeabilities, but if such coatings are annealed at 750 deg. Fahr. they acquire about the same permeability, therefore the magnetic method is more reliable for annealed coatings than for coatings as deposited.

Measurements on coatings as deposited are said to be correct within 15 per cent, and on annealed coatings within 10 per cent. The magnetic method is rapid and nondestructive, and for thin coatings its accuracy is stated as approaching that of metallographic measurements.

Increased Freight Rates To Southwest Approved

WASHINGTON, Nov. 30.—Reversing an earlier report, the Interstate Commerce Commission has handed down a decision finding justified proposed increased rates on iron and steel railroad material in carloads to, from and between points in the Southwest. The new rates became effective yesterday and establish rates made 32.5 per cent of the first class rates. Indicative of the increases are those of 16.5c. in the rate from Chicago and 15.5c. in the rate from Pittsburgh to Oklahoma City, Okla.

20,000 Visitors Have Seen U. S. Steel Plants in Chicago Area This Year

CHICAGO, Nov. 30. — Trips through Chicago district steel mills are becoming a standard attraction for Chicagoans and tourists, figures released by the Carnegie - Illinois Steel Corp. indicate. Company officials estimate that before the end of the year approximately 20,000 people will have visited the Chicago district operations of the largest United States Steel subsidiary.

Figures compiled by the organization's Chicago district plant superintendents show that more than 17,000 people have toured the mills so far this year. South works at South Chicago heads the list, having played host to approximately 7800. The largest single group to tour this plant was the Chicago chapter of the American Society for Metals. More than 500 visited the plant on this occasion. Other groups sponsoring tours included the Chicago chapter of the American Institute of Banking, the Chicago Church Federation and the Chicago Board of Education.

At Gary, approximately 5000 visitors have inspected the steel mills this year. Railroad presidents and engineers, university and high school students, and the Lake County Farmers Association were among visitors to this plant.

Approximately 1300 visitors have toured the corporation's Gary sheet and tin mills during 1937. The largest group to visit this plant was composed of delegates to the Association of Iron and Steel Engineers convention, which totaled 800. Other visitors included high school and college students and a vocational teachers' group.

At Elwood, Ind., the corporation's American works, first successful tin plate manufacturing plant in the United States, held an "open house" day in connection with the first annual Indiana Tomato Festival, Aug. 11. More than 4000 people toured the plant on that day.

Women No Longer Barred

A feature of steel plant tours is the fact that women are no longer barred from steel plants. Women have been represented in many of the groups making special tours and also on the public tours made through the plants. Among recent groups to tour Gary works was a delegation from the P. E. O. Sisterhood.

Public tours are held at South works, 3426 East 89th Street, South Chicago, each Monday, Wednesday and Friday at nine in the morning and one in the afternoon. Gary works offers public tours on the second and fourth Saturdays of each month during the summer season. Tours are arranged for large groups, however, throughout the year.

Public tours of the steel mills were first offered last year in response to requests from the employees of the plants, the original idea being to give wives, mothers and other relatives of steelmakers an opportunity to observe steelmaking processes. Beginning this year these tours have been open to the general public.

Individuals and groups can secure information on public tours by writing directly to the general superintendent of any Carnegie-Illinois plant.

Detroit Electro-Platers To Hear Four Speakers

DETROIT, Nov. 30.—Four outstanding speakers on electroplating will address the Detroit branch of the American Electro-Platers' Society and the American Society for Metals at the Hotel Statler, Detroit, Dec. 4. Dr. William Blum, chemist, National Bureau of Standards, Washington, will talk on the value of electroplating research to the manufacturing industry. George B. Hogaboom, Hanson-Van Winkle-Munning Co., Matawan, N. J., will speak on the value of thickness of electrodeposited coatings. Prof. Edwin M. Baker, department of chemical engineering, University of Michigan, will speak on preparation or cleaning of metals prior to plating. Floyd F. Oplinger, the R & H Chemical Department, E. I. duPont De Nemours & Co., Niagara Falls, N. Y., will speak on practical methods for the disposal of alkali and metal cyanide solutions. This last is regarded as a particularly timely subject in view of the current work to prevent stream pollution.

Ohio Electric Mfg. Co., Cleveland, maker of split phase, capacitator, polyphase and shaded pole a.c. and d.c. motors, has appointed the following sales representatives: C. D. Blincoe, 2123 Trevillion Way, Louisville, Ky.; H. L. Prather, 27-8 Essex St., S.E., Minneapolis; Delavan Engineering Co., 414 12th Street, Des Moines, Iowa.

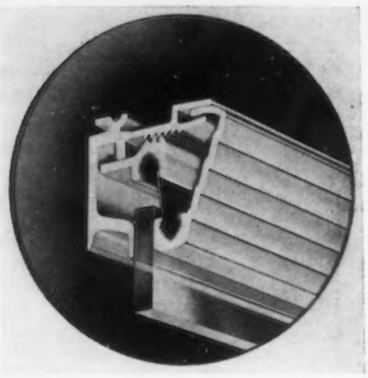
Effects of Surtax Sought in Illinois

THE Illinois Manufacturers Association, recently, asked its members for information on the influence which the Federal surtax on undistributed profits had upon their business during 1936 and 1937.

The association sought data on plant rehabilitation or expansion, stability of employment, debt retirement, increase of indebtedness to banks or stockholders, difficulties encountered in estimating taxable net income before the close of the year as a basis for dividend action, restoration of depleted working capital and other matters involving the surtax.

Extrudalite—a New Metal Sash

A NEW type extruded metal sash known as "Extrudalite," for store front construction has been announced by Libbey-Owens-Ford Co., Toledo, Ohio. It is designed to provide stability for windows and also meet the need for metal sash to be used with the newer types of flat structural glass. It is self-supporting, and a feature is that it cushions the rigid members which hold the glass instead of placing a cushioning spring against the glass itself. Pressure on the glass is applied evenly because the set-screws strike a positive stop with a direct pressure exerted on a rigid clip lever which transfers it to the cushioning spring, thence to the rigid face piece which applied the pressure to the glass. Interlocking teeth in the base member and in the glass member make this possible. The spring acts as a shock absorber against vibrations and expansions and acts as a stabilizer by throwing pressure back against the glass when temperature reductions cause contraction. According to Libbey-Owens-Ford, the sash provides a water-proof and weather-proof joint.



CROSS section of Extrudalite store front sash. Pressure exerted by set-screws which hit a definite stop behind the glass is transferred through the cushioning spring (shown by the shaded area) to the rigid face piece which distributes the pressure along the glass.

All sections are made of solid extruded metal, aluminum alloy No. 53S being standard, with bronze also available. The standard finish on aluminum is Alumilite with other finishes available on special order.

Another new Libbey-Owens-Ford product is a structural glass stair rail and banister, produced in colors.

President's Housing Program Embodied in Senate Bill

WASHINGTON, Nov. 30.—While hailed in Democratic circles as leaving little to be desired in a program to spur private construction of large-scale housing developments, the President's message to Congress on Monday, in which he called for revision of the FHA to launch a $12,000,000,000 to $16,000,000,000 building program as "an important part" of plans for increasing general business activity, was viewed by some Congressional critics as not offering any material solution to the current business recession.

Senator Arthur Vandenberg, Republican, of Michigan, while supporting the general objectives of the message, particularly the suggestion that conferences between capital and labor be held in an effort to reduce unit building costs, said he had "no illusion" that the President's scheme alone would revive the building industry.

Describing it as integrated with the whole business situation, Vandenberg said that "jobless workers cannot buy or repair homes at any price; and frightened and hamstrung capital cannot buy or repair homes on any basis.

"Our need," the Senator said, "is to treat this dangerous recession as a whole and with forthright abandonment of past and present errors and forthright proof that we propose to give prosperity a chance."

Building Lag Retards Industry

President Roosevelt told the Congress that housing construction has not kept pace with either the needs or growth of our population, explaining that from 1930 to 1937 the average annual number of new dwelling units constructed in this country was 180,000 as contrasted with an annual average of 800,000 in the seven years prior to 1930.

"The long-continued lag in building is a drag on all industry and trade," the President said. "This presents an urgent problem which is the common concern of industry, labor, and government. All business needs the infusion of orders and the diffusion of purchasing power that come when building is thriving. Great numbers of people look directly or indirectly to the construction industry for employment. This industry, to a greater extent than any other, can put idle funds to work and thus speed up the circulation of the nation's money supply. This, in turn, would increase national income, reduce unemployment and as a result contribute toward a balancing of the budget."

Mr. Roosevelt listed the downturn in housing construction during the past spring and summer as "one of the principal reasons why general business failed to forge ahead during the latter part of the year." And he attributed rising construction costs, which he said rose "far too sharply" between

September, 1936, and March, 1937, as responsible for the current lag in building.

Urges Reduction of Costs

He urged that capital and labor confer as to methods of reducing costs, and that the Government take the initiative by (1) bringing about a reduction of financing costs; (2) by making it easier for families of moderate means to buy or rent new houses; and (3) by providing ways for private enterprise to build large-scale housing developments for the mass market.

Broadening of the present Federal Housing Act was proposed by the President along these lines: (1) Reduction of interest charged on loans from the present 5½ per cent to 5 per cent per annum; (2) reduction of mortgage insurance premiums from the present ½ of 1 per cent to ¼ of 1 per cent on houses valued at $6,000 or less. This would be based on the diminishing balance of an insured mortgage rather than on the original face amount as now required by the act; and (3) increase the insurable limit from 80 per cent to 90 per cent of the appraised value of the property.

Emphasizing the importance of financing large-scale projects, Mr. Roosevelt suggested liberalization of the act's provisions for chartering National Mortgage Associations so they could sell housing bonds or debentures secured by insured mortgages. Present provisions for large-scale loans, because of their size, have made it difficult to finance them by means of a single mortgage, the President asserted.

RFC Loan of $50,000,000 Proposed

The RFC will be asked to make $50,000,000 available for capital purposes and this, together with the amendments suggested, would make $1,000,000,000 of private funds available through the sale of National Mortgage Association debentures, the President said.

Senator Robert F. Wagner, Democrat, of New York, introduced a bill embodying the President's proposals.

Mr. Roosevelt said that conferences between representatives of industry, labor and finance, giving housing construction "a fresh start," will be initiated by him and that cooperation from all sources will work "to the advantage of our whole national economy."

Pointing out that the rise in hourly wage rates and material costs last spring were "too rapid and too great for the consumer to bear," the President did not put the blame on either group.

"I am simply pointing out what did occur and what the consequences were," he said.

President's "Buy Now" Policy May Bring $250,000,000 U. S. Orders

WASHINGTON, Nov. 30.—Prompted by the President's suggestion that Government departments adopt a "buy now" policy to stimulate winter business, a score of department heads are trying to anticipate their requirements for the next seven months in an effort to make purchases immediately rather than spreading them throughout the remainder of the present fiscal year which ends June 30.

President Roosevelt made the request after the Government's purchasing agent, the Procurement Division of the Treasury, headed by Admiral Christian J. Peoples, advised the White House that close to $250,000,000 worth of equipment and supplies could be contracted for within the next few weeks.

Two stumbling blocks apparently stood in the way of immediate buying. One was the Budget Bureau regulation that not more than one-twelfth of a department's supply fund could be expended in any one month. The other was the difficulty of anticipating needs and the inability of some departments to alter their buying habits.

The Central Statistical Board has made recommendations in the past for changes in purchasing technique in the interest of greater economy and efficiency but it is understood that the suggestions have not had a pronounced effect upon most departments.

Among the purchases listed by the Procurement Division for the last fiscal year are:

Boats, marine equipment and boilers, $2,209,204; tools, $2,147,110; metal and structural metal, $25,479,912; other building materials including stone, brick and paint, $91,490,978; machinery and allied equipment, $25,370,469; railway, dock yard and fire apparatus, $1,600,315; and agricultural implements including wagons, $3,265,264.

The bulk of these purchases was made under emergency and relief appropriations. Current appropriations in this category have been reduced probably by 40 per cent.

With the exception of regular purchases for War and Navy Department supplies and equipment, the Procurement Division is the Government's purchasing agent for all departments.

10 Months' Exports of Steel Products Almost Double Those of 1936

WASHINGTON, Nov. 30.—Exports of iron and steel products, exclusive of scrap, in October amounted to 336,993 gross tons, valued at $23,314,188, according to preliminary figures of the Division of Minerals and Metals, Bureau of Foreign and Domestic Commerce. The third highest monthly total of the current year, the October movement exceeded September exports 17.2 per cent in quantity and 20.9 per cent in value.

For the first 10 months of 1937 exports of iron and steel products aggregated 2,864,063 tons, valued at $179,084,019, compared with 958,807 tons, valued at $69,369,851 exported in the corresponding period of 1936, an increase of 198.7 per cent in quantity and of 158.2 per cent in value. The 1937 movement also exceeded by 40.9 per cent in quantity and 9.2 per cent in value exports for the first 10 months of 1929.

Continuing their downward trend, exports of scrap in October totaled 185,618 tons, valued at $3,541,123, in comparison with 256,191 tons, valued at $4,815,993, in September. For the first 10 months of 1937, however, scrap exports at 3,520,812 tons were almost 100 per cent higher than for the corresponding period of last year with an aggregate of 1,751,046 tons.

The outstanding item of exportation in the iron and steel list in October was pig iron, 66,298 tons, of which 37,388 tons went to Japan, 10,690 tons to the United Kingdom, 7534 tons to Italy and 5783 tons to Germany. Ranking second were exports of plates, 59,085 tons, the chief outlet being Japan, which took 21,333 tons. Tin plate exports at 36,098 tons ranked third and went to widely diversified markets.

The leading markets for scrap in October were Japan 61,665 tons, United Kingdom 36,119 tons, Germany 16,882 tons, Poland and Danzig 15,994 tons, Netherlands 15,819 tons, Canada 15,619 tons and Italy 14,810 tons.

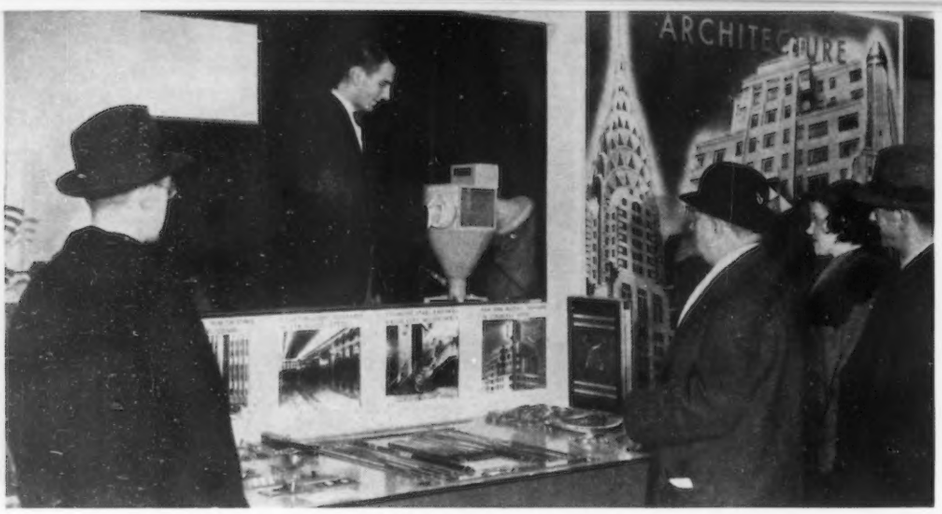
Governor Miller Is Honored at Launching

A BIG civic celebration honoring Nathan L. Miller, general counsel of United States Steel Corp., and other high officials of the corporation, its subsidiaries and the American Shipbuilding Co. is being observed by the City of Lorain, Ohio, today (Dec. 2) when the new ore carrier, *Governor Miller*, is launched for the Pittsburgh Steamship Co., U. S. Steel subsidiary.

A luncheon will be given in honor of Governor Miller and his associates by the Lorain Chamber of Commerce as part of the general civic celebration. School children will receive a partial holiday so they may witness the launching.

The 610-ft. ore carrier is being built at Lorain by the American Shipbuilding Co.

The *Governor Miller* is the second vessel to be launched for the steamship company this fall at Lorain, the *William A. Irvin*, a sister ship, having taken the water on Nov. 10. Both vessels are identical in construction.



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HOW sandblasting is used to produce an attractive finish on stainless steel is one of the demonstrations in the architectural section of the exhibit. The attendant further explains by means of motion pictures in the rear of the booth why stainless steel is so popular a material for decorative murals and architectural trim.

o o o

Development of Stainless Steel Is Shown

UNDOUBTEDLY the most comprehensive educational exhibit setting forth the history, development, production, fabrication and uses of stainless steel ever produced is that which has recently been opened in the New York Museum of Science and Industry in the RCA Building, Rockefeller Center, New York, under the auspices of the Electro Metallurgical Co., a unit of the Union Carbide & Carbon Corp., New York, with the assistance of scores of manufacturers of stainless steel and its products.

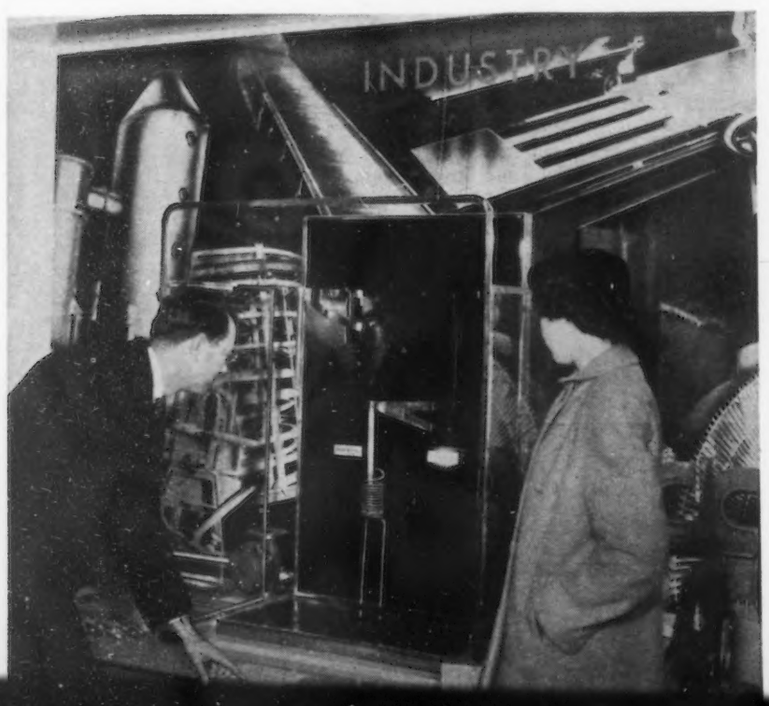
While the purely commercial aspects of stainless steel have been "played down" as much as possible in favor of the educational features, there is much of interest in the exhibit both for those who are primarily engaged in the commercial development and those who merely want to become better informed regarding this comparatively new and rapidly growing branch of the steel industry. The exhibit will appeal alike to students, teachers, housewives, architects, engineers, chemists, manufacturers and others.

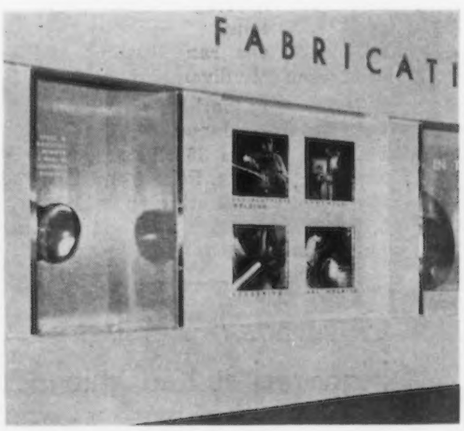
The display includes hundreds of stainless steel products sent to the Electro Metallurgical Co. by manufacturers from all over the United States. These products have been grouped according to the uses to which they are put, such as the household, the food and beverage industries, general industry, transportation, architecture and the medical and dental professions.

Displays of products are supplemented by motion pictures and demonstrations showing why stain-

THIS working demonstration illustrates the resistance of stainless steel to scaling at high temperatures. By pressing the button, bars of ordinary steel and stainless steel are successively raised to a red-heat temperature by means of a high-frequency induction coil.

o o o





FABRICATION methods such as drawing, spin- processes are illustrated by colored transparen- strations. These people are following the steps

o o o

IT is not hard to tell which knife is stainless steel and which is ordinary steel after both have been plunged into a lemon for a few minutes. The resistance of stainless steel to other food acids is graphically demonstrated by merely pushing the buttons on the glass case in the foreground.

o o o

In a Comprehensive Educational Exhibit

less steel is an important contribution to mankind. Every step in the production of stainless steel is shown. Operators give actual demonstrations of welding in connection with talks outlining the methods by which many types of stainless steel are fabricated. One interesting demonstration shows the sandblast method of etching stainless. Artists are now using this method for making decorative murals and architectural trim.

In demonstrating the manufacture of stainless steel, the operation of an electric furnace is shown by a transparency with colored lighting.

Each demonstration booth has a miniature motion picture show to amplify the talks, and at the conclusion of the tour of inspection visitors are ushered into a small auditorium, where a seven-minute moving picture of the various steps in manufacturing stainless steel is presented.

The exhibit will remain at the Museum of Science and Industry for six months, after which it will be moved to the Franklin Institute in Philadelphia.

Companies that have contributed to the exhibit either in an advisory way or in sending products are the following:

A

Akron Metallic Gasket Co., Akron, Ohio; Allegheny Steel Co., Brackenridge, Pa.; Aluminum Goods Mfg. Co., Manitowac, Wis.; American Brass Co., Waterbury, Conn.; American

o o o

THIS diorama of a modern milk plant, showing the use of stainless steel in separators, pasteurizers, tanks, milk cans and other dairy equipment will particularly interest housewives. This unit is supplemented by a working demonstration illustrating the resistance of stainless steel to lactic acid.

ning, forming, machining and the various welding cies as well as by actual specimens and live demonin the fabrication of a stainless steel pitcher.

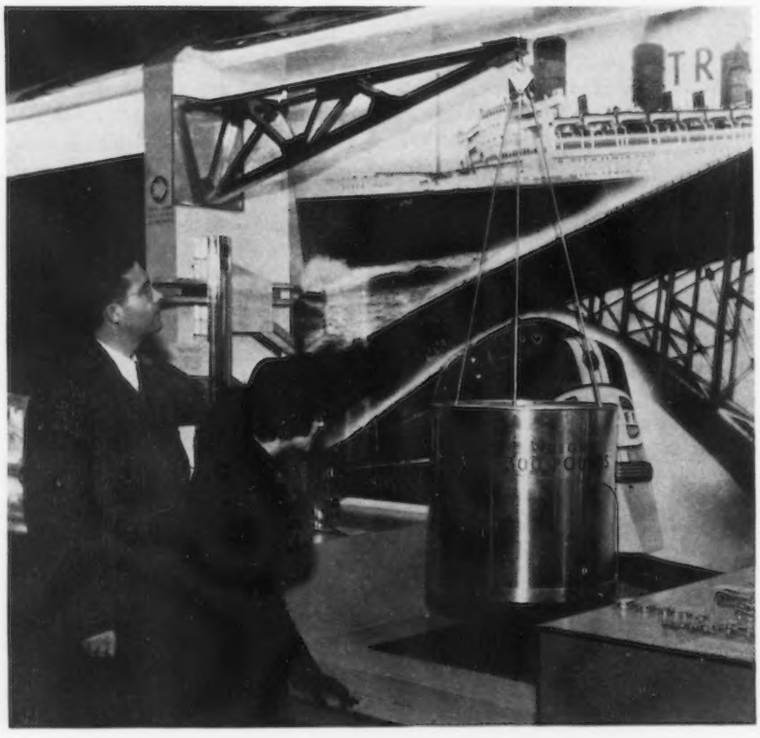
BELOW

PRESS the button, the platform lowers, and a stainless steel tank full of water and weighing 300 lb. is suspended from the end of a stainless steel beam weighing only 22 lb. —a remarkable demonstration of the high strength of lightweight stainless steel structures.

ABOVE

THE attendant is here demonstrating how two pieces of stainless steel are quickly and permanently joined by the "shot-weld" process. Just below is a lightweight section of an airplane wing built up of thin stainless steel members. Other exhibits in this section illustrate the many uses of stainless steel in transportation.

o o o



Chain & Cable Co., Inc., Hazard Wire Rope Div., Wilkes-Barre, Pa.; American Chain Co., Inc., Bridgeport, Conn.; American Steel & Wire Co., Chicago; American Manganese Steel Co., Inc., Chicago; Anderson Co., Anderson, Ind.; Anti-Corrosive Metal Products Co., Inc., Castleton-on-Hudson, N. Y.; Auld, D. L., Co., Detroit.

B

Bach, Oscar B., Studios, Inc., New York; Baldwin-Duckworth Chain Corp., Springfield, Mass.; Bard-Parker Co., Inc., Danbury, Conn.; Barnes, Wallace Co., Bristol, Conn.; Brasco Mfg. Co., Harvey, Ill.; Breeze Cor-

AT LEFT

THE attendant is explaining to this interested group of onlookers why the strength and corrosion resistance of stainless steel are so invaluable for lightweight construction. This general view shows the industrial and architectural sections of the exhibit.

porations, Inc., Newark, N. J.; Buckeye Bumpers, Springfield, Ohio; Budd, Edward G., Mfg. Co., Philadelphia; Burleigh Brooks, Inc., New York.

C

Carnegie-Illinois Steel Corp., Pittsburgh; Cargille, R. P., New York; Calorizing Co., Pittsburgh; Carpenter Steel Co., Reading, Pa.; Carrollton Metal Products Co., Carrollton, Ohio; Central Scientific Co., Chicago; Chicago Metal Hose Corp., Chicago; Cleveland Dental Mfg. Co., Cleveland; Colonial Sales Corp., New York; Corbin Screw Corp., New Britain, Conn.; Craft Mfg. Co., Chicago; Crane Co., Chicago; Crucible Steel Casting Co., Lansdowne, Pa.; Crucible Steel Co. of America, New York.

D

Duraloy Co., Pittsburgh.

E

Elmer & Amend, New York; Eisele & Co., Nashville, Tenn.; Electric Auto-Lite Co., Bay Mfg. Div., Toledo, Ohio; Electric Welding Co., McKees Rocks, Pa.; Elkay Mfg. Co., Chicago.

F

Fafnir Bearing Co., New Britain, Conn.; Firth-Sterling Steel Co., McKeesport, Pa.; Florence Stove Co., Gardner, Mass.

G

General Etching & Mfg. Co., Chicago; George Bell Jewelry Co., New York; Goetze Gasket & Packing Co., Inc., South New Brunswick, N. J.

H

Hanson Co., C. H., Chicago; Harrington & King Perforating Co., Chicago; Haskelite Mfg. Corp., Chicago; Haslam, Fred & Co., Inc., Brooklyn; Hauserman, E. F., Co., Cleveland; Hendrick Mfg. Co., Carbondale, Pa.; Himmel Brothers Co., New Haven, Conn.; Hubbard Spool Co., Chicago; Hussong-Walker-Davis Co., Philadelphia.

I

International Nickel Co., New York; International Silver Co., Meriden, Conn.

J

Jelliff Mfg. Corp., C. O., Southport, Conn.

K

Kawneer Co., Niles, Mich.; Kinkead Industries, Inc., Chicago.

L

Lalance & Grosjean Corp., Woodhaven, L. I., N. Y.; Lamson & Goodnow Mfg. Co., Shelbourne Falls, Mass.; Lamson & Sessions Co., Cleveland; Lee Spring Co., Inc., Brooklyn, N. Y.; Ludlum Steel Co., Watervliet, N. Y.

M

Maine Steel Products Co., South Portland, Me.; Metal Sponge Sales Corp., Philadelphia; Michiana Products Corp., Michigan City, Ind.; Michigan Steel Casting Co., Detroit; Milwaukee Metal Spinning Co., Milwaukee; Mixing Equipment Co., Inc., Rochester, N. Y.; Motor Products Corp., Detroit.

N

Newark Wire Cloth Co., Newark, N. J.; Northhill Co., Inc., New York.

O

Ontario Knife Co., Franklinville, N. Y.

P

Parker-Kalon Corp., New York; Pass & Seymour, Inc., Solvay, N. Y.; Perma-Maid Co., Inc., New York; Polar Ware Co., Sheboygan, Wis.; Powell, William Co., Cincinnati.

Q

Quadriga Mfg. Co., Chicago.

R

Remington Arms Co., Inc., Bridgeport, Conn.; Republic Steel Corp., Cleveland; Rodney Hunt Machine Co., Orange, Mass.; Rosiclare Lead & Fluorspar Mfg. Co., Rosiclare, Ill.; Rose Iron Works, Inc., Cleveland; Royal Silver Mfg. Co., Inc., Norfolk, Va.

S

Savory Appliance, Inc., Newark, N. J.; Schnitzer Alloy Products Co., Elizabeth, N. J.; Shakespeare Co., Kalamazoo, Mich.; Sklar, J., Mfg. Co., Brooklyn; South Bend Bait Co., South Bend, Ind.; Speakman Co., Inc., Wilmington, Del.; Stainless Steel Products Co., La Grange, Ill.; Sta-Brite Products Corp., New Haven, Conn.; Stanley Works, New Britain, Conn.; Steelsmiths, Inc., Meriden, Conn.; Stevens Metal Products Co., Niles, Ohio; Superior Steel Corp., Pittsburgh.

T

Troy Sunshade Co., Troy, Ohio; Turner Devices, Inc., St. Louis; Turner & Seymour Mfg. Co., Torrington, Conn.

U

United States Steel Corp., New York.

V

Vita-Needle Co., Needham, Mass.; Voos Co., New Haven, Conn.

W

Wallace, R., & Sons Mfg. Co., Wallingford, Conn.; Weis, Henry, Mfg. Co., Inc., New York; Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.; White, S. S., Dental Mfg. Co., Elkhart, Ind.; Wickwire Spencer Steel Co., New York; Wilcox-Rich Div. of Eaton Mfg. Co., Detroit; Wilson Sporting Goods Co., Chicago.

Y

York Safe & Lock Co., York, Pa.

Steel Employment Down 2.7% in October; Payrolls Off 11.5%

STEEL employment in October declined only one-seventh as much as the volume of steel production, and total payrolls of the industry dropped only half as much as did output, it is shown in a report released Tuesday by the American Iron and Steel Institute.

A total of 586,600 were employed in the industry in October, the report showed, only 2.7 per cent below the September total of 602,700, which was within one-tenth of 1 per cent of the all-time peak of 603,100 employees.

Total steel payrolls amounted to $76,191,000 during the month, a decline of 11.5 per cent from September when $86,161,000 was paid out. By comparison, the tonnage of steel ingots produced in October was 21 per cent less than in September.

Both employment and payrolls in October were substantially above the totals in October, 1936, despite a 25 per cent drop in tonnage produced. The number at work in the industry in October, 1937, was over 10 per cent greater than the total of 531,400 employed in October, 1936, while October, 1937, payrolls were 7 per cent above the $71,110,000 paid to steel employees in October of last year.

From March, the peak month of 1937 in steel production, through October, ingot tonnage has declined 35 per cent, but over the same period steel payrolls have declined only 16 per cent and the number of employees has acutally increased 1.6 per cent.

The following table compares steel employment and payrolls for October and September, 1937, with October, 1936:

	October, 1937	September, 1937	October, 1936
Number employees	586,600	602,700	531,400
Total payrolls	$76,191,000	$86,161,000	$71,110,000
Av. hourly earnings, wage earners	83.1c.	84.3c.	66.3c.
Av. hours per week, wage earners	31.9	36.8	42.5

Railroad Officials Say Adequate Earnings Would Bring Large Equipment Programs

WASHINGTON, Nov. 30.—Sharp stimulus to the iron and steel industry and the many related supplying industries and to labor would be given by the railroads if their credit is strengthened by adequate earnings, rail executives told the Interstate Commerce Commission at hearings begun yesterday on their petition for increased rates.

Supporting testimony of the first witness, J. J. Pelley, president of the Association of American Railroads, Ralph Budd, president of the Chicago, Burlington & Quincy Railroad, estimated probable expenditures of $900,000,000 for improved plant and equipment in each of the next several years if the application for higher rates is granted.

The railroads are asking for a flat increase of 15 per cent in freight rates, except in five commodities for which certain maximums are requested. On bituminous coal and coke the carriers are requesting an increase of 15c. per net ton except where in the ICC decision of Oct. 22 an increase of 15c. was granted, the maximum asked is 10c. The Eastern lines are likewise asking an increase from 2c. to 2½c. per mile in passenger coach rates. Water carriers also have petitioned for a 15 per cent increase in rates and truck operators propose a similar advance The latter are not required to petition the ICC for rate increases.

The large hearing room crowded to overflowing, Mr. Pelley, explaining the financial distress in which the rail carriers find themselves, pointed out that normally they are a $1,000,000,000 customer of all industry. The dollars which they spend, he said, for the thousands of things they buy, like the dollars which they spend in payrolls, spread over the United States and go into almost every industry.

Opportunities for effecting economies and improving service through the investment of new money are among the most promising features of the present railroad situation, Mr. Budd said, but added that the first essential of any such investment is net earnings sufficiently large to support railroad credit.

"The railways," Mr. Budd said, "might well replace their 2,000,000 cars in the next two decades through the purchase of 100,000 new cars a year, at an annual expenditure of $300,000,000. They also might advantageously purchase 2000 new locomotives annually for the next several years, at a yearly cost of another $300,000,000, while a like sum could be spent to good purpose for other physical improvements to the railway plant. Such a program of capital expenditures, however, calls for the restoration and stabilization of railroad credit, which, in turn, can be brought about only by adequate net earnings."

Estimating an annual saving of $125,000,000 in operating expenses if the present freight equipment were replaced with new lightweight freight cars, Mr. Budd said: "We now have alloys that are quite revolutionary in what they offer in the way of opportunities to increase the strength and carrying capacity of cars and at the same time lessen their weight. It is possible to build freight cars that will weigh less and carry more, and in that way to improve the ratio between the weight of the cars and weight of the pay load to a striking degree. To give some idea of the measure of these possibilities the American railroads, in the handling of cars alone, not counting their contents, produce about 500,000,000,000 ton-miles of transportation in a year. It is entirely practicable, if the money were available, to reduce the weight of freight cars by one-fourth, which would mean a reduction of 125,000,000,000 ton-miles in the movement of cars alone, in a year. At the very low allowance of one mill per ton mile, this would mean a saving of approximately $125,000,000 a year after the cars now in use were replaced with the lighter cars. That represents what at the moment would seem to be a proper goal which might be attained, perhaps, at the end of 20 years, when the existing equipment would be retired.

2000 Locomotives a Year

"The same kind of alloy metals that make this possible also make possible great improvements in locomotives and in track. There are, for instance, about 45,000 locomotives on the railways of the country, and 2000 new locomotives a year could be built advantageously for several years. The return on the $300,000,000 a year required for this purpose would be probably 20 per cent on the investment. The advantages of the high tensile alloys in locomotives are specially noticeable in reducing the impact on the track. The maintenance of tracks and bridges under high-speed movement will be greatly reduced by these improvements in locomotives.

"Similarly, the improvements that have been made in track materials, particularly rail, afford the railroads an opportunity to spend large amounts of money for track betterments upon which they could show a very satisfactory return. One of the cheering things about the railway outlook is the opportunity which lies immediately before us to spend large amounts of money for units of plant which in each case would be far superior to those which have been retired or would be replaced. If we now could be put on a stable basis of credit, it would be possible to take advantage of the fact that for the last five or six years we have been decreasing our plant at a time when a lesser number of units would handle the available traffic, and now, as the requirements are before us to keep the plant up to its present size, we can modernize it at the same time."

No Surplus of Freight Cars

After discussing the situation of the Burlington and its substantial shrinkage in the number of cars and locomotives and even in miles of track during the five years 1932-36, inclusive, when a great many more cars were retired than built, Mr. Budd said that it is apparent now that the time has come when the number of freight cars no longer exceeds the needs. Speaking generally, he said, there will have to be as many replacements as retirements.

"That means," he stated, "that if business is to continue at the level of 1936 and the average for the year 1937, there should be something like 2000 cars constructed

for the Burlington each year for several years to come. There should be some new locomotives built every year; there should be some improvements made in our shops in the way of machinery and tools; and, of course, we will have to make rather extensive renewals of rails and ties."

He estimated that the carrying out on the Burlington of the improvement work mentioned will involve expenditures of perhaps $12,000,000 a year on an average, and that they will entail borrowing a considerable part of the money. This point made in urging that in connection with financing these improvements it is highly essential to maintain the broadest possible market for railroad securities or else the price will be low and the interest yield to maturity will be correspondingly high.

Cites Need for More Income

Dr. J. H. Parmelee, director of the Bureau of Railway Economics, detailed the economic plight of the carriers, which, he said, has brought them to the necessity of drastic retrenchment in purchases and employment. This situation, he pointed out, results from the fact that the railroads are being pinched between declining levels of freight and passenger rates on the one hand and rising prices, higher wages and mounting taxes on the other hand. This retrenchment, Dr. Parmelee said, has a serious economic effect on employment, on manufacturers of railroad supplies and their employees and on general business activity.

Costs of operation, he stated, during the past four years have risen while the average level of freight charges and passenger fares has declined. Because of these trends, Dr. Parmelee declared, annual operating costs are today approximately $665,000,000 greater than they were in 1933, while the railroad revenue is less by more than $200,000,000 than it would be if carried at the average rates of 1933. It is estimated that if the increased rates asked were granted they would yield about $500,000,000 annually.

An Advance Expected

The general view is that the ICC hearings will be protracted but that both the rail and water carriers will be allowed a considerable proportion of the higher rates asked.

Sharp attacks against further increases will be made by coal, livestock and vegetable and fruit interests. Also protests will be made by the National Industrial Traffic League, which represents a wide variety of shippers. The National Coal Association asked the ICC to dismiss the hearing as it applied to bituminous coal, but was overruled.

At the suggestion of Mr. Aitchison a steering committee of shippers representing various commodities was elected to determine procedure and to cross-examine railroad witnesses. The committee is headed by R. C. Fulbright, Washington attorney. Members of the committee and commodities they represent include, among others: Iron and steel, J. K. Hiltner, U. S. Pipe & Foundry Co., Burlington, N. J.; bituminous coal, F. F. Estes, traffic manager, National Coal Association; coke, H. A. Hollopeter, traffic director, Indiana State Chamber of Commerce; ores, John Putman, general counsel, Lake Superior Iron Ore Association, and John Holton.

Mr. Hiltner pointed out that certain shipping groups are not against the proposed increases and said that the iron and steel group he represents favors the idea of an increase but is opposed to the railroads' method in issuing a flat raise.

One especially strong point the railroads, water carriers and trucking interests have is that in its October decision the ICC suggested they raise their competitive rates simultaneously in order to eliminate the present and costly practice of undercutting each other by reducing rates below the cost of service. The ICC said this practice was responsible to a substantial degree for the financial stress these carrying services face.

While the hearing was begun before the entire ICC membership it has been placed in charge of a division made up of Commissioners Clyde B. Aitchison, Chairman, Marion M. Caskie and Claude B. Porter.

Hearings in Washington promise to last a week or 10 days at least.

Lake Superior Ore Movement By Water 62,598,836 Tons in 1937

SHIPMENTS of Lake Superior ore by water during 1937 were 62,598,836 tons, an increase of 17,776,813 tons, or 39.66 per cent, over the movement of 44,822,023 tons last year. The 1937 movement was the largest since 1929, the record-breaking year for water shipments with a movement of 65,105,595 tons. Water shipments during November were 1,424,679 tons, a decrease of 2,333,472 tons, or 62.09 per cent from November last year.

LAKE ORE SHIPMENTS BY WATER
(Gross Tons)

	November	Season, 1937	Season, 1936
Escanaba	205,575	3,147,977	2,392,958
Marquette	203,023	5,101,700	4,284,377
Ashland	204,238	5,651,879	4,623,618
Superior	525,220	22,222,116	16,236,502
Duluth	133,416	16,731,688	11,738,528
Two Harbors	153,207	9,743,476	5,546,040
	1,424,679	62,598,836	44,822,023

WATER SHIPMENTS OF LAST 10 YEARS
(Gross Tons)

1928	53,980,874	1933	21,623,898
1929	65,204,600	1934	22,249,600
1930	46,582,982	1935	28,358,800
1931	23,467,786	1936	44,822,023
1932	3,567,985	1937	62,598,836

FTC Issues Order vs. Metal Window Group

THE Federal Trade Commission has issued a cease and desist order against the Metal Window Institute and its 19 member manufacturers which, according to the charges, have been fixing prices on their products in violation of Section 5 of the FTC Act.

Under the order, the respondent companies are prohibited from maintaining any price fixing combination, and have been directed to discontinue the alleged practices of: Maintaining minimum prices and uniform selling terms; submitting estimates in certain areas to the Institute or other clearing house where elimination of price competition in bidding is involved; inducing by concerted action a competitor to maintain prices, sales terms or discounts favored by the group; seeking bid withdrawal where quoted prices are below the established prices; comparing discounts, prices or sales terms in bidding or otherwise collusive bidding, and other practices.

In this connection, however, the order specifically provided that "nothing therein shall prevent the gathering, compilation and distribution to the trade of statistics, including net prices, terms of sale . . . when not done for the purpose or with the effect of policing the activities prohibited by the order."

Fundamental Characteristics Of Chain Drives

(CONTINUED FROM PAGE 53)

chain sprocket is recommended. The plate flange on the driven sprocket is employed where heavy guide action is likely, such as high-powered drives on moving mechanisms and on heavy horsepower installations."

Economical Speeds

Chain drives have been successfully installed for applications ranging from fractional to 5000 hp., at operating efficiencies ranging up to between 98 and 99 per cent. All chains wear eventually, particularly those used to transmit heavy horsepowers at high speeds. As chains wear, pitch lengthens. When pitch lengthens appreciably it is often possible to replace the link pins with new, oversize pins, thus bringing the effective pitch back to normal. Otherwise, a new chain will be required, because continued use of oversize-pitch chain will cause excessive friction and aggravate the wear on both chain and sprockets, and eventually will result in jamming the whole drive.

There has been a tendency of late to use higher speed chain drives everywhere. Factors of overall economy, however, seem to indicate that at present there are certain economical speed limits to be observed. While it is entirely possible to operate chain drives at speeds up to 3500-4000 ft. per min., or even higher, wear is apt to be excessive at high speeds. Consequently a sixth chain drive characteristic may be stated in approximate terms:

6 — Finished steel roller chains are most economical at speeds not exceeding 1200-1400 ft. per min. Up to 600 ft. per min. they may be operated open and lubricated with a light grease or medium consistency mineral oil. Over 600 ft. per min. they should be enclosed in an oil-retaining casing and lubricated with a light mineral oil. Silent chain drives are most economical at speeds between 1200 and 2000 ft. per min. They may be run open at speeds up to about 1300 ft. per min. and lubricated with light mineral oil brushed on periodically. Over that speed they should be enclosed in an oil-retaining casing and lubricated with light mineral oil applied by splash or dripfeed.

Many special material chains are now available for use under conditions where corrosion is encountered, and these require special consideration as regards speed, load-strength and other important factors. The figures given above are for finished steel roller chains and for steel silent chain of high quality design and construction.

Chain drives are easily installed, the removal of a single pin being sufficient to open any chain. First cost compares favorably with any other form of drive on installations of 20 hp. or over. The high load carrying capacity of metal chain generally results in a chain drive taking less space than a belt drive. Normal chain will take up to 100 per cent overloads for short periods. With high operating efficiency, a properly designed and installed chain drive should have a very long life.

(Chain drive applications will be discussed in the next chapter.)

British Disturbed By Large Imports of American Sheets

LONDON (*Special Correspondence*).—It is rumored in London that new developments may be seen shortly in the long-standing question of the supply of steel to the British automobile industry, as a result of increasing imports of American steel sheet during the past few months. British steel sheet manufacturers are rather worried about this trend and are wondering what steps they should take to meet the position.

During October total United Kingdom imports of steel sheets amounted to £94,918 ($474,590), compared with £37,451 ($187,255) a year ago. Higher prices, of course, were responsible for a part of the advance, but quantities were also materially greater at 6326 tons, against 3738 tons. About 25 per cent of this total is said to represent American steel sheet purchased by automobile manufacturers.

Some of the British sheet makers are believed to be in favor of asking the Import Duties Advisory Committee to consider the present position, but the trade as a whole is anxious to obtain an understanding without recourse to the committee. It is possible that unofficial approaches may later be made to the automobile manufacturers on the matter.

A possible explanation of the increased imports of American sheets is that contracts were placed some months ago when there was widespread uncertainty about supplies and prices in the United Kingdom. Indeed, the reduction in the import duties was actually carried out to facilitate this while the steel shortage was at its peak.

British sheet steel makers are anxious to see a settlement of this position arrived at with the minimum of delay, as there appears to be the one section of the steel trade in which a slackening of activity is visible.

Wolfram Prices Drop As Famine Ends

LONDON (*Special Correspondence*).—At the outset of the Sino-Japanese war the price of wolfram was carried up to nearly £6 10s. ($32.50) on the British market, compared with 31s. ($7.75) per unit at the beginning of 1937. Recently, however, the process has been reversed and the current price is around 60s. ($15) per unit, with business difficult to negotiate.

The principal reason for this sudden decline is that the war has not prevented the Chinese wolfram monopoly from fulfilling its contracts. The outbreak of hostilities found the Chinese monopoly, which is responsible for the largest part of the world's wolfram supplies, well sold ahead. It was feared that the monopoly might not be able to export these supplies, but shipment has been effected, partly through Hongkong and partly out of stocks which the Chinese authorities held in New York.

At the time when prices advanced sharply many of the South American producers were also too well sold ahead to be able to take full advantage of the rise. They now have greater supplies to offer. However, the only important supplies which are being forced upon the market are second-hand par-

cels offered by speculators. Wolfram is a bad commodity for speculators to dabble with, as there is no futures market, and the operator has to buy physical wolfram in store or afloat. Nevertheless, during the shortage in August and September considerable speculation did take place, and this is now being liquidated.

The decline in wolfram prices has already eased the position of high-speed steel manufacturers who use tungsten as a hardening alloy. They have no need to buy heavily now, as they naturally protected themselves by buying ahead when the market started to rise. They are also still taking delivery of tungsten which they purchased on the basis of a higher price for wolfram.

It would seem probable that the future movement of high-speed steel prices will be downward. Already there has been some reduction in the prices which high-speed steel makers pay for scrap from their customers. But predictions for any considerable period ahead are impossible.

Pennsylvania's 44-hr. Week Law Not To Be Effective Until Jan. 3

PITTSBURGH, Nov. 30.—With last-minute requests from hundreds of businesses and industries in Pennsylvania for variations under Pennsylvania's 44-hr. law, state labor and industry officials extended the deadline one month to Jan. 3, 1938. The law was to go into effect Dec. 1 and calls for an 8-hr. day, 44-hr. week.

Although the petition for variations in the law with respect to the steel industry, which were discussed in THE IRON AGE, issue of Nov. 18, has not been specifically or officially answered as yet, general regulations promulgated yesterday cover practically every request made by steel and kindred industries. Meanwhile last minute news indicates that municipalities whose employees are subject to the provisions of the law may seek a court test of the constitutionality of the statute.

A summary of general regulations promulgated yesterday and which cover fairly completely difficulties which would have been faced in the steel industry are as follows:

1. **Executive and Secretary**—An executive is classified as a manager responsible for a business and who directs or supervises subordinates and earns at least $25 a week. A secretary is defined as a person who renders services of a private or confidential nature which are a component part of the work of an executive. Both are exempt from the provisions of the law.

2. **Half Day of Work**—A half day of work is considered to be not more than five consecutive hours.

3. **Five-Day Week**—Employees on a five-day week are permitted to work up to 10 hr. in any one day but not in excess of 44 hr. in any one week.

4. **Six-Day Week**—Employees may work for six consecutive hours if they are dismissed at the end of this time and provided they are allowed a 15 min. rest period. Employees who work regularly on this schedule for six days a week are considered to be conforming with the five and a half day provisions of the law. Main industry to benefit from this variation will be glass companies, many of which work a 6-hr. day, six days a week.

5. **Existing Labor Contracts**—Hours of work in excess of those allowed by law, contained in existing labor contracts, may be permitted to stand until the termination of the contract, at which time they will revert to the provisions set forth in the 44-hr. week law.

6. **Inventory Periods**—Employees are permitted to work 10 hr. a day, 58 hr. in six days provided these periods do not exceed five weeks in one year, three of which must be in December. State Labor Board must be notified in advance of such exceptions to the law.

7. **Salesmen**—Salesmen and outside representatives are not limited by the law.

8. **Employment of Three or Less Workers**—Employees of employers hiring three or less workmen are permitted to work 54 hr. a week, 9 hr. a day.

9. **Lunch Periods**—Employees may work through 8 hr. a day without compulsory lunch periods provided by law where manufacturing processes involve shift or continuous operations.

10. **Continuous Industries**—Hours may be averaged within a period of 20 weeks to keep within the maximum of 44 hr. weekly. An additional 8-hr. shift after a rest period of 8 hr. may be worked. Employees may continue to work after the shift ends where other employees fail to appear for work or where possible destruction of property or failure of service may result unless work is continued. Where vacations with pay are given, remaining employees may work an additional shift of 8 hr. a week.

11. **Watchmen, Janitors, Stationary Engineers, Firemen, Boilermen and Furnacemen**—Allowed to work more than 8 hr. a day but not more than 48 hrs. in six days of any week.

12. **Skilled Workers**—Upon application by the employer, schedules of hours may vary where shortage of skilled workmen exist, provided time and a half for overtime is paid.

13. **Schedule of Hours and Posting Notices**—May be dispensed with if impossible to fix definitely in advance the hours of employment of industrial workers but comprehensive system of payroll records must be maintained for inspection.

Miami Beach, Fla., plans pipe lines for extensions in water system; also other waterworks installation. Cost about $168,000. Financing is being arranged through Federal aid. M. N. Lipp is city engineer.

Winnsboro, La., closes bids Dec. 6 for pipe for water system; also for special castings, gate valves, fire hydrants and other waterworks installation. Swanson-McGraw-Hooper, Inc., Balter Building, New Orleans, is consulting engineer.

Wisner, La., closes bids Dec. 6 for pipe for water system, including special castings; also for deep-well pumping unit, motor-driven centrifugal pumps and accessories, elevated steel tank and tower and other waterworks installation. Swanson-McGraw-Hooper, Inc., Balter Building, New Orleans, La., is consulting engineer.

Springhill, La., has called special election Dec. 28 to approve bonds for $90,000 for pipe lines for water system, part of fund to be used for extensions in sewer system. Entire project will cost about $110,000. E. T. Archer & Co., New England building, Kansas City, Mo., are consulting engineers.

Tulsa, Okla., plans about 21,000 ft. of 8-in. in water improvement district near Lewis and East Eleventh Street. Cost about $45,000. M. C. Shibley is city engineer.

Grand Rapids, Mich., plans 42-in. main supply and feeder lines for water system in different parts of city; also smaller pipe lines in residential and industrial districts, and large underground reservoir in Franklin Park. Entire project will cost about $934,000, of which approximately $315,000 will be furnished by city and remainder through Federal aid. P. A. Kammeraad is city service director in charge.

Kouts, Ind., plans pipe lines for water system and other waterworks installation. Cost about $45,000. Financing is being arranged through Federal aid. Suhr, Berryman, Peterson & Suhr, 130 North Wells Street, Chicago, are consulting engineers.

Tipton, Iowa, plans about 5000 ft. of 4-in. for water system. Fund of $22,087 has been arranged through Federal aid and municipal appropriation.

Waverly, Mo., opens bids Dec. 4 for a waterworks and sewerage system. W. A. Fuller Co., 2916 Shenandoah Avenue, St. Louis, is engineer.

Alhambra, Cal., has awarded 122 tons of 16-in. pipe to American Cast Iron Pipe Co., Los Angeles.

San Bernardino, Cal., Board of Water Commissioners takes bids Dec. 2 on 181 tons of 4, 6 and 8-in. pipe, class 150.

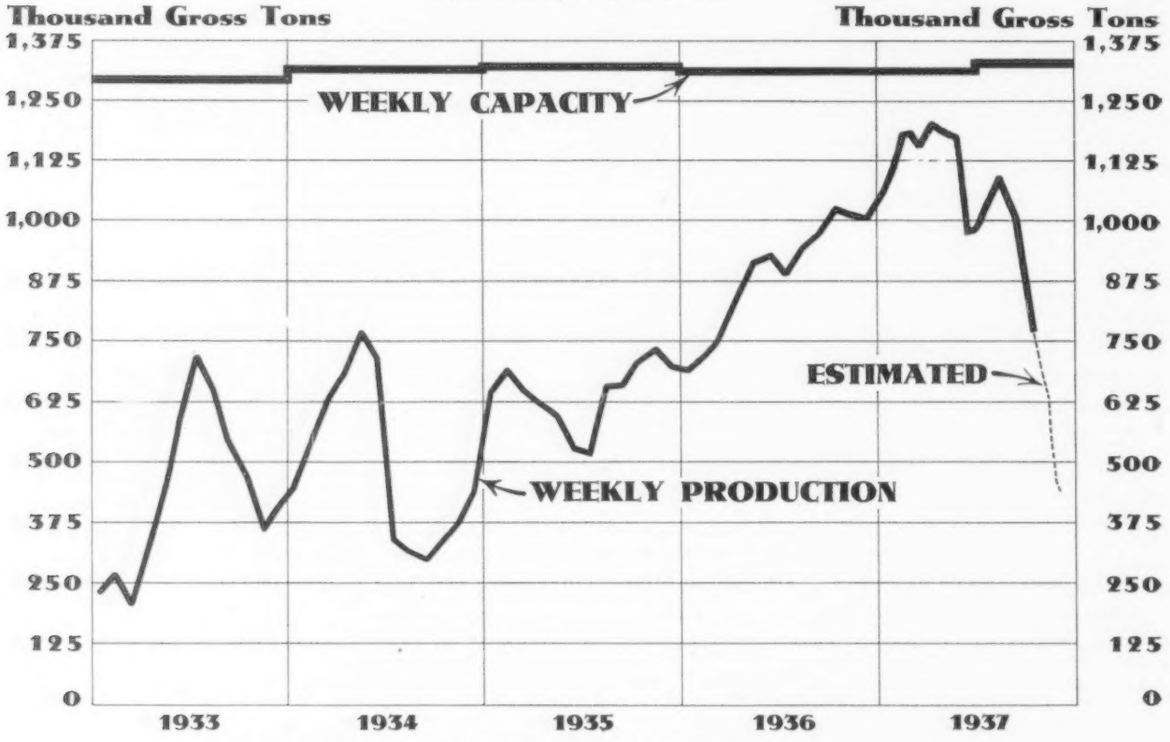
King County, Wash., has rejected all bids on 600 tons of 4, 6 and 12-in. pipe and fittings.

Milton, Wash., plans about five miles for water system; also concrete reservoir and other waterworks installation. Parker & Hill, Smith Tower Building, Seattle, are consulting engineers.

Vancouver, Wash., asks bids until Dec. 6 for 27,000 ft. of 6 to 16-in. for extensions in water system; alternate bids will be received on cast iron and transite pipe on all sizes, and on welded steel pipe for section of 16-in. line; also for 72,000 lb. of fittings, gate valves, hydrants, etc. J. L. Henderson is city engineer.

PRODUCTION

Average Weekly Production of Open-Hearth and Bessemer Steel Ingots by Months, 1933-1937, and Estimated Production by Weeks in 1937



Figures for the Current Week Are Not Indicated on the Chart Until the Following Week

STEEL INGOT PRODUCTION BY DISTRICTS: Per Cent of Capacity

	Current Week	Last Week
Pittsburgh	25.0	26.0
Chicago	30.0	30.5
Valleys	28.0	30.0
Philadelphia	34.0	38.0
Cleveland	31.0	29.0
Buffalo	21.5	21.5
Wheeling	56.0	55.0
Southern	46.0	46.0
Ohio River	22.0	27.0
Western	55.0	55.0
St. Louis	19.0	25.0
Detroit	46.0	58.0
Eastern	40.0	50.0
Aggregate	30.0	33.0

Weekly Booking of Construction Steel

	Week Ended				Year to Date	
	Nov. 30, 1937	Nov. 23, 1937	Nov. 2, 1937	Dec. 1, 1936	1937	1936
Fabricated structural steel awards	11,750	6,500	12,000	25,210	987,335	973,605
Fabricated plate awards	2,275	800	2,515	415	111,065	205,375
Steel sheet piling awards	1,200	0	185	1,195	63,815	53,970
Reinforcing bar awards	950	4,375	6,375	4,200	279,875	314,830
Total Lettings of Construction Steel	16,175	11,678	21,075	31,020	1,442,090	1,547,780

. . . .SUMMARY OF THE WEEK. . . .

▼ ▼ ▼

. . . Ingot production at 30 per cent may have hit bottom.

° ° °

. . . President Roosevelt injects price situation in housing message.

° ° °

. . . Scrap markets go no lower; Lake ore movement 62,598,836 tons.

THE possibility that the decline in steel ingot production has been checked at approximately this week's estimated rate of 30 per cent is suggested by the course of operations in various districts, with some minor ups and downs and unchanged output elsewhere. A sidewise movement of small swings is indicated for December, followed by an upward trend in January, but of less than seasonal proportions.

Despite the efforts being exerted at Washington to revive business, it is generally believed that the entire first quarter, at least, will be required for the period of convalescence from the drastic decline that has been experienced in most lines of metalworking production. In his advocacy of lower prices for materials as a stimulant for housing construction on a large scale, President Roosevelt has injected a fresh uncertainty, it being axiomatic in the steel industry that buying is withheld pending any downward adjustment of quotations.

The question of steel prices is so tightly bound up with high wages and prospective advances in freight rates that no easy problem is presented by the President's suggestion, considering that much of the present steel-making cost is directly traceable to the Administration's labor and taxing policies.

OF more immediate promise than the Government's housing program is the prospect of large-scale railroad buying, provided freight rate advances are permitted by the Interstate Commerce Commission with reasonable dispatch. In hearings at Washington the prospect was held out of purchases of 100,000 cars a year and up to 2000 locomotives a year for several years if railroad revenues are made sufficient.

Meanwhile, railroads continue to enter orders for rails and track supplies, though their purchases of other materials are inconsequential.

The Atlantic Coast Line and affiliated roads have placed orders for 50,000 tons of rails and 10,000 tons of fastenings. These roads include the Louisville & Nashville and the Nashville, Chattanooga & St. Louis, whose orders were reported a week ago. The Norfolk & Western has issued an inquiry for 25,000 tons of rails and fastenings, the Western Pacific for 22,000 tons and the Kansas City Southern for 5000 tons. The Western Pacific is also inquiring for 400 freight cars. Car shops are quoting on 2000 cars for the South Manchurian Railways, whose inquiry for 25 to 100 locomotives has been pending for some weeks.

The automotive industry is still buying lightly, but December schedules should show improvement, despite reduced operations at some plants, as Ford swings into volume production. Ford suppliers are expected to place steel orders soon.

This week's lettings of fabricated structural steel are less than 12,000 tons, with new projects calling for 14,000 tons, the largest being 5400 tons for another building in the Rockefeller Center group, New York. Bids will be taken Jan. 6 on 8000 tons of plate construction for the Grand Coulee Dam.

NOVEMBER steel buying is estimated by Pittsburgh mills at 16 per cent less than that of October. Some mills report, however, that tonnage in the latter half of November was slightly better than in the first half.

For the first time since late August there has been no decline this week in prices of steel scrap in any of the important markets. THE IRON AGE composite price is quoted at $12.92 for the third consecutive week. Scrap brokers believe that the decline has been halted, but look for no upward trend until steel production is definitely better.

The Great Lakes ore movement for 1937 has been completed. Shipments total 62,598,836 gross tons, exceeded only by the 1916 and 1929 totals, and were 17,776,813 tons, or 39.66 per cent, above the 44,822,023 tons shipped in 1936. The November movement was only 1,424,679 tons compared with 2,333,472 tons in the same month last year.

Bolt and nut prices have been reaffirmed for the first quarter. An announcement of the 1938 tin plate price is expected this week.

American steel mills may cooperate with the Continental steel cartel in preserving price stability in world export markets, according to cable advices following the meeting of the cartel in Paris. The proposed arrangement covers all products except thin sheets and tubes.

. . . PITTSBURGH . . .

. . . Ingot output down one point at Pittsburgh, up one at Wheeling-Weirton.

° ° °

. . . November steel orders about 16% below those of October.

° ° °

. . . Business better, however, in latter half of past month.

PITTSBURGH, Nov. 30.—Steel ingot output in the Pittsburgh district this week has declined one point to 25 per cent of capacity. It is logical to believe that bottom or near bottom has been reached. Meanwhile operations are more closely alined with incoming business than at any time in the past year and a half. The Wheeling-Weirton district rate is up one point to 56 per cent of capacity.

November steel specifications for the district as a whole are estimated to be approximately 16 per cent below the volume booked in October, with some companies doing better than this figure and others not as well. It is significant, however, that finished steel orders during the latter part of November were in better volume than during the early part of the month. At least two weeks or more will be required to determine whether a definite new trend has set in. It may be that the volume of incoming business will move sidewise for a while after the decline has been checked.

While hand-to-mouth buying practices persist, orders are a little more numerous and tonnages slightly larger, indicating perhaps that many customers have reached a low point on inventories. Plate and shape specifications and structural inquiries and awards continue to show the most satisfactory performance when contrasted with demand for other steel products.

Norfolk & Western Railway has approved a $3,700,000 buying program to include about 25,000 tons of rails and fastenings.

Japanese interests are inquiring for 2000 freight cars and may be in the market soon for more.

Leading bolt and nut manufacturers have reaffirmed present prices for first quarter delivery.

A tin plate price announcement is expected momentarily, with reaffirmation of present quotations anticipated.

Pig Iron

New business continues on a day-to-day basis and total tonnages placed are no better than a week ago. Shipments have fallen off further and closely approximate incoming business. Many blast furnaces now in operation have been slowed down to meet current conditions.

Semi-Finished Steel

Total bookings during November were somewhat below the volume placed in October. Specifications in the past two or three weeks have been irregular. Some slight improvement is expected in sheet bar demand owing to the year-end custom of advance tin plate rolling. Meanwhile, foreign inquiry has been more active lately but has not developed into firm contracts.

Bars

Weekly sales figures for hot rolled bars are exceedingly irregular owing to hand-to-mouth buying. Specifications during the past week as a whole were not any better than a week ago, although some companies report an increase. A pronounced improvement in specifications is not looked for before the first of the year. There is some indication, however, that the total volume of day-to-day sales is slightly larger than was the case early in November.

Cold Finished Bars

Miscellaneous demand is at its lowest point since the beginning of the recent decline in specifications. Total specifications are affected somewhat by occasional automotive buying, some of which materialized during the past week.

Reinforcing Bars

Inquiries and awards were less numerous during the past week than in the previous period. Tonnages involved are from 100 to 500 tons. Concrete bar specifications during November were below the volume booked in October and total sales during the past week were somewhat under the average for recent weeks.

Plates & Shapes

Both structural inquiries and awards show improvement from previous weeks. An apartment building in New York will require 1300 tons of steel while an office building at Rockefeller Center, New York, will take 5400 tons. American Bridge Co., Pittsburgh, was awarded 1070 tons of material for public school No. 259, New York City. There is no doubt that the current business situation and the Administration's fiscal policies are adversely affecting privately financed building projects.

Railroad Buying

The board of directors of the Norfolk & Western Railway has approved $3,700,000 equipment program which will include at least 25,000 tons of rails and fastenings. The South Manchurian Railroad is inquiring in this country for 2000 freight cars requiring at least 20,000 tons of steel. This is part of the Japanese Railway Ministry building program for 1937-38. It is understood present estimates call for 500 locomotives, 7000 freight cars and 200 passenger cars. No doubt some of this equipment will be fabricated in Japan.

Tubular Products

Tubular goods specifications are about on a par with a week ago. Most producers have by this time replenished stocks which were depleted considerably a few months ago. Production is now closely alined with the volume of incoming business.

Sheets

Sheet specifications are slightly better than a week ago but the total volume of business is still disappointing. Aggregate business booked in November was slightly more than half that placed in October. Fairly prompt delivery is being given in all cases and for

A Comparison of Prices

Market Prices at Date, and One Week, One Month, and One Year Previous
Advances Over Past Week in Heavy Type, Declines in Italics

Rails and Semi-finished Steel

Per Gross Ton:	Nov. 30, 1937	Nov. 23, 1937	Nov. 2 1937	Dec. 1, 1936
Rails, heavy, at mill	$42.50	$42.50	$42.50	$39.00
Light rails, Pittsburgh	43.00	43.00	43.00	35.00
Rerolling billets, Pittsburgh	37.00	37.00	37.00	32.00
Sheet bars, Pittsburgh	37.00	37.00	37.00	32.00
Slabs, Pittsburgh	37.00	37.00	37.00	32.00
Forging billets, Pittsburgh	43.00	43.00	43.00	39.00
Wire rods, Nos. 4 and 5, P'gh	47.00	47.00	47.00	43.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	2.10	2.10	2.10	1.80

Finished Steel

Per Lb.:	Cents	Cents	Cents	Cents
Bars, Pittsburgh	2.45	2.45	2.45	2.05
Bars, Chicago	2.50	2.50	2.50	2.10
Bars, Cleveland	2.50	2.50	2.50	2.10
Bars, New York	2.79	2.79	2.78	2.40
Plates, Pittsburgh	2.25	2.25	2.25	1.90
Plates, Chicago	2.30	2.30	2.30	1.95
Plates, New York	2.54	2.54	2.53	2.19
Structural shapes, Pittsburgh	2.25	2.25	2.25	1.90
Structural shapes, Chicago	2.30	2.30	2.30	1.95
Structural shapes, New York	2.5125	2.5125	2.5025	2.16¼
Cold-finished bars, P'gh	2.90	2.90	2.90	2.35
Hot-rolled strips, P'gh	2.40	2.40	2.40	1.95
Cold-rolled strips, Pittsburgh	3.20	3.20	3.20	2.60
Hot-rolled annealed sheets, No. 24, Pittsburgh	3.15	3.15	3.15	2.80
Hot-rolled annealed sheets, No. 24, Gary	3.25	3.25	3.25	2.90
Sheets, galv., No. 24, P'gh	3.80	3.80	3.80	3.40
Sheets, galv., No. 24, Gary	3.90	3.90	3.90	3.50
Hot-rolled sheets, No. 10, Pittsburgh	2.40	2.40	2.40	2.15
Hot-rolled sheets, No. 10, Gary	2.50	2.50	2.50	2.25
Cold-rolled sheets, No. 20, Pittsburgh	3.55	3.55	3.55	3.25
Cold-rolled sheets, No. 20, Gary	3.65	3.65	3.65	3.35
Wire nails, Pittsburgh	2.75	2.75	2.75	2.25
Wire nails, Chicago dist. mill	2.80	2.80	2.80	2.30
Plain wire, Pittsburgh	2.90	2.90	2.90	2.60
Plain wire, Chicago dist. mill	2.95	2.95	2.95	2.65
Barbed wire, galv., P'gh	3.40	3.40	3.40	2.70
Barbed wire, galv., Chicago dist. mill	3.45	3.45	3.45	2.75
Tin plate, 100-lb. box, P'gh	$5.35	$5.35	$5.35	$5.25

On export business there are frequent variations from the above prices. Also in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables.

Pig Iron

Per Gross Ton:	Nov. 30, 1937	Nov. 23, 1937	Nov. 2 1937	Dec. 1, 1936
No. 2, fdy., Philadelphia	$25.76	$25.76	$25.76	$22.3132
No. 2, Valley furnace	24.00	24.00	24.00	20.50
No. 2, Southern Cin'ti	23.89	23.89	23.69	20.44
No. 2, Birmingham†	20.38	20.38	20.38	16.88
No. 2, foundry, Chicago*	24.00	24.00	24.00	20.50
Basic, del'd eastern Pa.	25.26	25.26	25.26	21.8132
Basic, Valley furnace	23.50	23.50	23.50	20.00
Malleable, Chicago*	24.00	24.00	24.00	20.50
Malleable, Valley	24.00	24.00	24.00	20.50
L. S. charcoal, Chicago	30.24	30.24	30.04	26.2528
Ferromanganese, seab'd, carlots	102.50	102.50	102.50	75.00

†This quotation is subject to a deduction of 38c. a ton for phosphorus content of 0.70 per cent or higher.
*The switching charge for delivery to foundries in the Chicago district is 60c. per ton.

Scrap

Per Gross Ton:				
Heavy melting steel, P'gh	$13.25	$13.25	$14.75	$17.25
Heavy melting steel, Phila.	13.75	13.75	14.75	14.75
Heavy melting steel, Ch'go	11.75	11.75	13.75	16.50
Carwheels, Chicago	14.50	14.50	16.00	17.00
Carwheels, Philadelphia	16.25	16.25	17.75	16.75
No. 1 cast, Pittsburgh	16.25	16.25	17.25	16.25
No. 1 cast, Philadelphia	16.25	16.25	17.75	16.75
No. 1 cast, Ch'go (net ton)	11.50	11.50	12.25	14.50
No. 1 RR. wrot., Phila.	16.25	16.25	17.75	15.75
No. 1 RR. wrot., Ch'go (net)	9.75	9.75	12.00	14.25

Coke, Connellsville

Per Net Ton at Oven:				
Furnace coke, prompt	$4.25	$4.25	$4.25	$3.75
Foundry coke, prompt	5.00	5.00	5.00	4.25

Metals

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Electrolytic copper, Conn.	10.75	10.75	11.75	10.50
Lake copper, New York	*11.125*	12.125	12.125	10.62½
Tin (Straits), New York	**42.50**	41.625	47.75	51.37½
Zinc, East St. Louis	*5.25*	5.50	5.75	5.05
Zinc, New York	*5.60*	5.85	6.10	5.42½
Lead, St. Louis	4.85	4.85	5.35	5.05
Lead, New York	5.00	5.00	5.50	5.20
Antimony (Asiatic), N. Y.	*14.75*	15.75	17.25	12.50

The Iron Age Composite Prices

	Finished Steel	Pig Iron	Steel Scrap
Nov. 30, 1937	2.605c. a Lb.	$23.25 a Gross Ton	$12.92 a Gross Ton
One week ago	2.605c.	23.25	12.92
One month ago	2.605c.	23.25	14.42
One year ago	2.249c.	19.73	16.17
	Based on steel bars, beams, tank plates, wire, rails, black pipe, sheets and hot-rolled strip. These products represent 85 per cent of the United States output.	Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.	Based on No. 1 heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.

	Finished Steel HIGH	Finished Steel LOW	Pig Iron HIGH	Pig Iron LOW	Steel Scrap HIGH	Steel Scrap LOW
1937	2.605c., Mar. 9	2.330c., Mar. 2	$23.25, Mar. 9	$20.25, Feb. 16	$21.92, Mar. 30	$12.92, Nov. 16
1936	2.330c., Dec. 28	2.084c., Mar. 10	19.73, Nov. 24	18.73, Aug. 11	17.75, Dec. 21	12.67, June 9
1935	2.130c., Oct. 1	2.124c., Jan. 8	18.84, Nov. 5	17.83, May 14	13.42, Dec. 10	10.33, April 23
1934	2.199c., Apr. 24	2.008c., Jan. 2	17.90, May 1	16.90, Jan. 27	13.00, Mar. 13	9.50, Sept. 25
1933	2.015c., Oct. 3	1.867c., Apr. 18	16.90, Dec. 5	13.56, Jan. 3	12.25, Aug. 8	6.75, Jan. 3
1932	1.977c., Oct. 4	1.926c., Feb. 2	14.81, Jan. 5	13.56, Dec. 6	8.50, Jan. 12	6.43, July 5
1931	2.037c., Jan. 13	1.945c., Dec. 29	15.90, Jan. 6	14.79, Dec. 15	11.33, Jan. 6	8.50, Dec. 29
1930	2.273c., Jan. 7	2.018c., Dec. 9	18.21, Jan. 7	15.90, Dec. 16	15.00, Feb. 18	11.25, Dec. 9
1929	2.317c., Apr. 2	2.273c., Oct. 29	18.71, May 14	18.21, Dec. 17	17.58, Jan. 29	14.08, Dec. 3
1928	2.286c., Dec. 11	2.217c., July 17	18.59, Nov. 27	17.04, July 24	16.50, Dec. 31	13.08, July 2
1927	2.402c., Jan. 4	2.212c., Nov. 1	19.71, Jan. 4	17.54, Nov. 1	15.25, Jan. 11	13.08, Nov. 22

this reason there is little incentive for forward buying.

Strip

The volume of hot and cold rolled strip specifications during the past week was no better than in the previous period. Some orders are being received from automotive parts makers but tonnages involved are small. Miscellaneous demand continues dull.

Tin Plate

A tin plate price announcement is expected momentarily. Affirmation of present quotations is anticipated. Tin plate operations have receded a few points this week and may be estimated at 62 per cent of capacity. The main support for operations during the remainder of the year is expected to come from advance rolling of 1938 specifications.

Wire

Both manufacturers' and merchant wire sales appear to be holding their own and the total volume of orders during the past week is on a par with the previous period. Aggregate sales in November, however, were below those booked in October.

REINFORCING STEEL

. . . Awards of 950 tons —3175 tons in new projects.

AWARDS

Harrisburg, Pa., 320 tons, finance building, to Sweets Steel Co., Williamsport, Pa.

Hamburg, Pa., 100 tons, tuberculosis hospital, to Bethlehem Steel Co.

Torrance, Pa., 350 tons, hospital, to Sweets Steel Co.

Bakersfield, Cal., 177 tons, high school, to Kyle & Co., Fresno, Cal.

NEW REINFORCING BAR PROJECTS

New York, 150 tons, Canal Street post office; bids in.

Weehawken, N. J., 925 tons, contract MHT-71, main approach roadway and ramp, Lincoln Tunnel; bids received by Port of New York Authority until Dec. 16. Contract also covers 46 tons structural steel, 38 tons cast steel, and small tonnages of wire mesh and cast iron.

State of Pennsylvania, 300 tons, various small projects; bids Dec. 10.

Cincinnati, 400 tons, paving of decks and approaches, Eggleston Avenue viaduct.

Springfield, Ill., 300 tons, Lakeside power house.

Chicago, 170 tons, commercial testing laboratory, Chicago Engineering Works; bids in.

Chicago, 500 tons, merchandise building for A. T. Galt; bids in.

Wichita, Kan., 225 tons, bridge.

Berkeley, Cal., 105 tons, Whittier school; bids opened.

Petaluma, Cal., about 100 tons, sewage disposal plant; bids opened.

Youngstown Sheet & Tube Co. has declared the regular quarterly dividend of $1.37½ per share on the preferred shares, payable Jan. 1, 1938, to shareholders of record Dec. 9, 1937. The regular quarterly common dividend was reduced from $1 per share to 75c. per share and is payable Dec. 20, 1937, instead of Jan. 1, 1938, to shareholders of record Dec. 9, 1937. This will bring the dividend distribution to common shareholders in the year 1937 to $3.25 per share.

RAILROAD BUYING

Western Pacific is inquiring for 50 50-ton gondola cars with drop ends, 100 50-ton flat cars, 250 50-ton steel sheathed box cars.

United States Engineer Office, Federal Building, Honolulu, T. H., asks bids until Dec. 28 for 300 special steel cars (Circular 7).

American Car & Foundry Motors Co. has received orders for 15 motor coaches, 10 for Conestoga Transportation Co., Lancaster, Pa., and five for Memphis Street Railway Co., Memphis, Tenn.

J. G. Brill Co. has received an order for eight modern street cars for Bogota Tramways, Bogota, Colombia, S. A.

South Manchurian Railways are inquiring in this market for 2000 freight cars. An inquiry from the same source for 25 to 100 locomotives is still pending.

Denver & Salt Lake City Railway Co. is inquiring for 16 tenders.

RAILS AND TRACK SUPPLIES

Atlantic Coast Line and affiliated railroads have ordered 50,000 tons of rails and 10,000 tons of accessories, according to an announcement made by Lyman Delano, chairman of the board of the Atlantic Coast Line and Louisville & Nashville. This group of roads includes the Nashville, Chattanooga & St. Louis and the Clinchfield Road. THE IRON AGE last week reported the placing of 20,500 tons by the Louisville & Nashville and 4890 tons by the Nashville, Chattanooga & St. Louis. The Clinchfield has ordered 1500 tons, which would leave about 23,000 tons for the Atlantic Coast Line. The official announcement states that the combined rail order is the largest placed by the roads since 1931. Of the total tonnage, about 26,000 tons was allotted to the Tennessee Coal, Iron & Railroad Co., but the distribution of the remaining tonnage has not been officially stated.

Norfolk & Western has inquired for 25,000 tons of 131-lb. rails and fastenings, which is part of a program of general improvements to cost $3,700,000, according to an official announcement. Other expenditures will be made for shop tools, for 4000 sets of air brakes for freight car application, and construction of storage tracks and an interlocking plant at Devon, W. Va. Extension of the westward passing siding at Dorney, Ohio, a distance of 4190 ft., and expansion of four passenger station tracks at Roanoke are also included in the program.

Western Pacific is inquiring for 22,000 tons rails and fastenings.

Kansas City Southern is in the market for 5000 tons of rails.

..SAN FRANCISCO..

. . . Western Pacific inquires for 22,000 tons of rails and fastenings.

SAN FRANCISCO, Nov. 29.—Inquiry is being made by the Western Pacific Railroad Co. for 22,000 tons rails and fastenings, 50—50-ton low side gondolas with drop ends; 100—50-ton steel underframe flat cars; 250—50-ton steel sheathed, wood-lined box cars. Purchase of the rails will probably be completed within the next fortnight. The railroad will ask soon for bids on materials for the construction of a new locomotive and machine shop at Sacramento, Calif.

Bidding has been set for Jan. 6, 1938, by the Bureau of Reclamation for furnishing and erecting steel penstocks and pump-inlet pipes for the Grand Coulee Dam, Wash. The work involves the furnishing of three 72-in. diameter and 18—18-ft. diameter penstocks and the erection of the penstocks in place in the dam, except the upstream section of each penstock, and the furnishing of 12—14-ft. diameter pump-inlet pipes and the making of all field welds for the pipes after they have been placed in position by the contractor for the construction of the dam.

Award has been made by the Metropolitan Water District, Los Angeles, for 1200 tons of fence posts, 1180 tons of fence fabric, 150 tons of barbed and plain wire material, and for the construction of woven wire fences and gates at certain reservoirs of the Colorado River aqueduct. Successful bidders are: Schedule No. 1, Anchor Post Fence Co., $187,916; schedule No. 2, Pittsburgh Steel Co., $161,540; schedules No. 3, 4, 5, Los Angeles Fencing Co., $63,620.

Relining and reconditioning of the Provo, Utah, furnace of the Columbia Steel Co. is near completion and company officials announce that it will resume the manufacture of pig iron this week.

Tacoma, Wash., calls for bids Dec. 6 for about 500 tons of 36 and 48-in. steel pipe. Kings County, Wash., has rejected all bids on 600 tons cast iron pipe (alternate steel) and fittings.

RYERSON

R

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Cold Drawn Alloys
S. A. E. 2315, 2320, 2330, 3115, 3120, 3135, 3140.

Heat Treated Alloys
Ryco (hot rolled, machine straightened); Rycrome (hot rolled, cold drawn, machine straightened); Nikrome "M" (hot rolled, machine straightened); Ry-Ax and Ry-Arm.

Stainless
Allegheny Stainless sheets, plates, rounds, squares, hexagons, flats, angles, pipe, tubing, bolts, nuts, etc. in a variety of finishes.

Cold Finished Steels
Standard Shafting; turned ground and polished; Special Accuracy Stock; Rycase High Manganese Screw Stock; S. A. E. 1020, 1035, 1112, 1120, etc.

Tool Steels
Ryerson B. F. D. Die Steel; Ryerson "Shock" Steel; Ryerson V. D. Steel; Ryerson High Speed Tool Steel; Ryerson Special High Speed Tool Holder Bits.

Special Sheets
21 special quality sheets. Also all standard sheets such as plain black galvanized, corrugated, etc.

General Steel Products
Beams; Channels; Angles; Tees; Zees; Plates (17 kinds); Spring Steel; Tire Steel; Refined Iron; Boiler Tubes and Fittings; Bolts; Screws; Nuts; Washers; Rivets.

Floor Plate, Stair Tread
Inland 4-Way Floor Plates and Traffic Plates; Firm-tread Diamond Pattern Floor Plate and Traffic Plates; Mason Safety Treads, etc.

Welding Rods
19 Kinds of electrodes including improved stainless steel rods, shielded arc type rods, and special processed rods, 8 kinds of acetylene rods.

Building Products
New billet and rail steel reinforcing bars, spirals, electrically welded wire fabric, expanded metal, reinforcing mesh, caisson rings, sheet piling, bank vault reinforcing, safety treads.

Allied Products
Ryertex Bearings, Babbitt Metal, Solder, Flux, Curb Strip, Wire and Wire Rope, Chain, Slings, Slip and Grab Hooks, etc.

. . . . CHICAGO . . . .

. . . Ingot output drops only slightly, from 30½ to 30%.

o o o

. . . 1200 tons of hull plates bought for Lake oil tanker.

o o o

. . . Steel scrap prices holding; decline may have been checked.

CHICAGO, Nov. 30. — Ingot output lost a slight amount of ground this week as the rate of operations dropped one-half point to 30 per cent of capacity. Small reductions in activity at three mills were almost offset by a gain at another district plant, while production at the fifth mill in this area remained steady.

Sales and specifications last week were reported by one large producer as being just a little under the average for the past six weeks, Thanksgiving Day and the consequent shorter week being a factor in the decrease. Incoming orders are so light that a comparison with shipments is difficult in some cases, but it is generally believed that production is about equal to consumption and that mills are geared to demand rather closely, although reduction of inventories makes any such statement hazardous.

Still providing an encouraging tone are the manufacturers of farm implements and tractors, whose operations, although curtailed somewhat recently, are still at a comfortably high rate, and give promise of so continuing for some time to come, since a good demand is anticipated in the spring. Sellers report that orders received for bars, strip, etc., are largely from the farm equipment industry.

Railroad purchasing is still out of sight, although small tonnages are understood to be coming in every week for miscellaneous repair work. Nothing to speak of is being bought for the building of new equipment, as yet, not even for the roads' own shops.

About 1200 tons of hull plates will be required for a 300-ft., $750,000 oil tanker to be built for the Socony-Vacuum Oil Co., by the Manitowoc Shipbuilding Co. About 750 men will be employed on the vessel, which is the first ever to be built by the company in the Chicago district and should be completed by May 1, 1938. Electric-welded, all-steel construction will be used, and power will be provided by two 750-hp. diesel engines. Capacity will be 1,180,000 gal. and service will be between the East Chicago, Ind., refinery and northern Lake ports. Steel for this project will be rolled in an unnamed Chicago mill.

Tonnages from the motor car industry are improving to some degree but the volume is still not up to expectations. No marked increase in specifications is expected from this source over the remainder of the year, but steel men look for some improvement within a short time.

The practice of buying only for immediate needs is being followed universally and inventories are being worked down.

The price of heavy melting steel is holding at last week's level of $11.50 to $12 a ton, and brokers are hopeful that the bottom of the current decline has been reached. All prices continue nominal in the absence of mill sales.

Pig Iron

Shipments during the first 26 days of November, as reported by leading sellers, are off about 19 per cent as compared with last month, while foundry coke is down only 9 per cent. Merchant iron production is unchanged, with two furnaces in blast. Producers are trying not to add to their already high inventories. It is understood however, that thousands of tons of steel-making iron have been piled in order to maintain current operations as long as possible. No appreciable change has been reported from automobile, machine tool, farm equipment or jobbing foundries.

Plates

The first sizable order in many weeks came to light this week when 1200 tons of plates was ordered from a district mill for the hull of the Socony-Vacuum Oil Co.'s new tanker. With railroad demand practically non-existent, the chief buyers of plates today are structural fabricators and tank makers. The smallness of this demand is evidenced by the fact that delivery may be made in one week.

Warehouse Business

Demand upon warehouses is following a seasonal path downward as consumers try to enter the new year with low inventories. This movement at present, however, is accentuated by the general decline in business but not discouragingly so, according to jobbers here, as orders and activity are still fairly good, everything considered.

Bars

Day-to-day buying on the part of motor car builders has been a major factor in the current reduction in activity among bar salesmen. Encouraging reports from Detroit, however, indicate that parts makers and automobile manufacturers may soon be stepping up production. At present bar orders are mostly from farm equipment sources.

Sheets

Although still the most influential buyer of sheets, the automobile industry is not specifying heavily enough as yet to make customers wait more than two to three weeks for cold-rolled material. Production of stoves is said to be lessening, while refrigerator activity is better in comparison. Hot rolled sheets are available in one to two weeks, and hot rolled annealed may be had in two to three weeks.

Wire and Wire Products

The remainder of 1937 appears none too encouraging to leading wire interests here, as customers everywhere report their desire to end the year with as low an inventory as possible. Little merchant business is expected before late in January. Current specifications and orders for electrical and manufacturing wire and wire rope are coming in at a snail's pace.

Structural Shapes and Reinforcing Bars

Again this week structural and reinforcing columns contain a high proportion of private projects, a direct reversal of the trend established during the summer and one continued until the past few weeks. Price cutting is prevalent on reinforcing lettings. Deliveries are prompt.

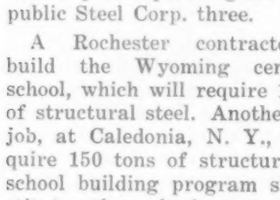
...Pig iron buying in small lots; steel operation unchanged.

BUFFALO, Nov. 30.—New buying of pig iron is confined to occasional carloads. Foundries' backlogs are disappearing and the melters are working on inventories. The active list of pig iron stacks remains at eight.

Open hearth operation is unchanged, with Bethlehem's Lackawanna plant operating six and Republic Steel Corp. three.

A Rochester contractor will build the Wyoming centralized school, which will require 125 tons of structural steel. Another school job, at Caledonia, N. Y., will require 150 tons of structural. The school building program still constitutes the only important building that is going on in western New York. Commercial construction is almost at a standstill. Sears, Roebuck & Co. will build an additional Buffalo store, but the steel involved is only 50 tons.

Warehouses report somewhat better business with a well-distributed demand. One large seller had more orders last week than for the two weeks previous.



...Further recession in buying and in production.

CINCINNATI, Nov. 30.—Further recession in finished sheet ordering was noted the past week as year-end influences exerted pressure in the market. Desire to keep inventories low against December check-ups for taxes and other items prompted a little shading in demand, according to mill interests. Automotive specifications are still disappointing as car builders feel their way before making commitments. Present volume is between 20 to 25 per cent of capacity. The trade forecasts an uptrend after the turn of the year.

Production of steel ingots is being further reduced. Two more open hearths have been taken off; seven out of 34 are now in operation. Two interests have no furnaces in production.

Pig iron melters tend to retard new buying. Business is in small lots for current use. Foundry operations are lower to an average of about 40 per cent, with machine tool melters still the most active.

General Purchasing Officer, Panama Canal, Washington, asks bids until Dec. 9 for about 47,500 ft. of galvanized welded steel pipe and 2480 ft. of black welded steel pipe; also for black pipe fittings, malleable iron pipe fittings and cast iron soil pipe fittings (Schedule 3303).

New York State Natural Gas Corp., Wellsboro, N. Y., plans about 5000 ft. of 6¼-in. steel pipe in connection with drilling of new wells and extensions in pipe line facilities in Oriskany natural gas field near Coudersport, Potter County, Pa. Entire project will cost over $60,000.

Bay Pipe Line Corp., 205 Bearinger Building, Saginaw, Mich., recently organized with capital of $250,000, has secured rights of way and will proceed with construction of new welded steel pipe line from oil field district in Buckeye Township, Gladwin County, Mich., to Bay City, Mich., about 33 miles, for crude oil transmission to new refinery to be built at latter place by Bay Refinery Corp., an affiliated company. Pumping stations will be installed along route. Cost close to $200,000. Both companies noted are affiliated with Gordon Oil Co., Hersee Building, Mount Pleasant, Mich.

Sunset, La., has called special election Dec. 7 to vote bonds for $25,000 for municipal natural gas distributing system.

Amsco Refining Corp., Corpus Christi, Tex., plans 4½-in. welded steel pipe line from Luby oil field, Nueces County, to Clarkwood, about 12 miles, for crude oil transmission to company refinery at first noted place, where expansion will be carried out to increase handling capacity from 4000 to 10,000 bbl. of oil per day. New pipe line will connect with present system at Clarkwood. Cost close to $90,000 with booster pumping stations and other operating facilities.

Caldwell, Tex., closes bids Dec. 6 for a butane gas system. Bond issue of $42,000 has been authorized. Joseph J. Rady, Majestic Building, Fort Worth, Tex., is consulting engineer.

General Petroleum Corp., 108 West Second Street, Los Angeles, plans two 12-in. welded steel pipe lines across Cerritos Channel, harbor district, Long Beach, Cal., near drawbridge at Henry Ford Avenue, for natural gas transmission. Pipe lines will be laid in trench excavated to an elevation of 52 ft. below mean lower water level.

Board of Contracts and Awards, Tacoma, Wash., closes bids Dec. 6 for 8300 ft. of 48-in. and 1200 ft. of 36-in. electric welded steel pipe for main pressure water supply for industrial use, including specials, fittings and enamel coating.

...Oil fields the best current market for steel.

ST. LOUIS, Nov. 30.—The bright spot in the demand for finished iron is in the Oklahoma oil fields, where there is considerable activity. During the week there was some buying of structural shapes, plates and forgings. Otherwise, there was very little doing.

Consumers are holding down on their inventories, and buying only what they must have for a specific job. Operations in stove plants are virtually through for the year with the exception of repair work, and there is no buying of sheets by this industry.

Operations of structural fabricators in the district are estimated to be down to 30 to 35 per cent of capacity. List & Weatherly, Kansas City, Mo., are low bidders on a signal and refuge bay platform requiring 100 tons of shapes for the St. Louis municipal bridge.

An agricultural implement concern has bought 1000 tons of malleable pig iron for first quarter delivery. Otherwise, there was very little buying of this raw material. Shipments of pig iron are very light, and melters are imbued with the one idea of holding down inventories. When 1937 ends, it is expected that there will be very little iron in the yards of melters. This is a healthy condition as far as movement from makers is concerned. However, there is a heavy backlog of orders in hands of makers representing purchases previously made and which must be moved during the first quarter.

Ingot operations are down to 19 per cent of capacity.

Plans are in progress for a prison sub-unit to be built by the State of Missouri at Jefferson City, consisting of six buildings of brick and reinforced concrete, to cost approximately $900,000. Alonzo H. Gentry, Voskamp & Neville, Inc., Kansas City, are architects.

A 40-acre tract at Columbia, Mo., has been selected for the State Cancer Hospital for Indigents, for which $500,000 is available. Dr. Ellis Fischel, St. Louis, is chairman of the commission, which will select an architect soon.

. . . CLEVELAND . . .

. . . Steel production appears to be in balance with demand.

o o o

. . . 1937 ore movement completed; 62,598,836 tons shipped by water.

CLEVELAND, Nov. 30.—Steel production appears to have leveled off to meet the current demand. Ingot output in the Cleveland-Lorain district advanced two points this week to 31 per cent of capacity. In the Youngstown district there was a decline of two points to 28 per cent of capacity. New business in finished steel shows virtually no change from the previous two weeks.

Intent on cutting inventories to a minimum, consumers are continuing their hand-to-mouth buying policy. Some who ordinarily placed mill orders are now buying from jobbers because their purchases are in such small lots. More business is being placed for delivery after Jan. 1, but these orders are for small tonnages. Most consumers still have fairly large stocks of sheets and strip steel. However, stocks of hot-rolled bars, plates and structural shapes have been reduced so much that reports indicate that stocks of these products are now rather small.

Bookings of finished steel during the last half of November were slightly better than during the first half of the month but the total volume of the month was well below that of October. The outlook for December is not promising, although some gain in orders for January shipment is expected.

The Lake shipping season has closed with a total water movement of 62,598,836 tons of Lake Superior ore, or about 3,500,000 tons less than expected before the downward trend in steel production caused a curtailment of ore shipping schedules. Water shipments in 1937 were exceeded in only two previous years, 1916 and 1929. Furnaces accumulated large stocks of ore during the shipping season. The amount in furnace yards and on docks Dec. 1 will be approximately 41,000,000 tons. These stocks at the opening of navigation in April were slightly under 17,500,000 tons.

Pig Iron

Shipments have been curtailed to the extent that the melt apparently is greater than the amount of iron that foundries are taking in. With reduced operations, motor car foundries have cut down on shipments. Iron continues to move in fair quantities to agricultural implement foundries. With decreased operations considerable iron that was purchased for the last quarter delivery will be carried over until next year. A few sales are being made in lots of from a carload to 100 tons.

Bars, Plates and Shapes

Hot rolled bars remain very quiet. There is little new demand from the automotive industry and orders are scarce from miscellaneous consumers, who are using up their stocks. Some business is coming from agricultural implement plants. Demand for structural shapes is holding up fairly well. While no large projects are pending there are a number of inquiries out for school houses in northern Ohio, these taking quite small tonnages of structural shapes and reinforcing bars. A State bridge in Knox County requiring 200 tons has been awarded to the Bethlehem Steel Co. Local fabricating shops that have kept busy on small work are now in need of orders. There is little call for plates.

Iron Ore

The Lake shipping season closed with the dispatch of the last ore cargo from Escanaba Nov. 27. The water movement in November was 1,424,679 tons and for the season 62,598,836 tons, an increase of 39.66 per cent over last year. Shipments by ports for the season are shown in another column.

Sheets and Strip

The volume of sheet business continues very light, showing little change from the previous few weeks. However, some of the mills report a slight gain in small orders for early shipment, indicating that some consumers have used up their stocks of certain sizes. Automobile manufacturers continue to place quite a few orders but none of these is of any size. Refrigerator manufacturers have ordered rather sparingly for starting production on new models. Little business is coming from other makers of household equipment and many of these are reported to still have good stocks which they intend to reduce to a minimum before making new purchases. Little hot or cold rolled strip tonnage is being released by motor car plants and new demand from other sources is almost negligible. With backlogs wiped out, production is being further curtailed.

Bolts and Nuts

With good-sized inventories, consumers and jobbers are buying from hand to mouth and the industry is operating at only about 35 per cent of capacity. Automobile manufacturers are ordering in much smaller lots than normally. Manufacturers have reestablished for the first quarter present prices on all bolt and nut products. The simplified practice eliminating many stock sizes, recently recommended by the Department of Commerce and prepared in conjunction with manufacturers, has been approved by the American Institute of Bolt, Nut and Rivet Manufacturers. Makers will issue new lists and discounts shortly. Should a buyer want a small lot of a size no longer included in the stock list, he will be charged an extra.

S.A.E. Plans Production Meeting For Flint

THE annual production meeting of the Society of Automotive Engineers will be held at the Hotel Durant, Flint, Mich., Dec. 8, 9 and 10. Technical sessions are open to all who are interested and prepared discussions of the various production papers are invited by the Society. During the three-day session, plant visits will be paid to Fisher Body No. 1 (Buick) at 9 a. m. Thursday with an alternate trip scheduled to A. C. Spark Plug Co. On Friday at 9 a. m. the transmission, forging, coil spring, sheet metal, axle, motor and final assembly departments of Buick's Plant No. 66 will be visited.

. . . *Pig iron sales are almost nil.*

BOSTON, Nov. 30. — November went down in local pig iron history as one of the dullest months on record. Sales last week were practically nil. The recession in business starting around Labor Day has carried operating schedules down to 50 per cent of capacity in the case of the most important foundries, and down to 30 per cent and in a few instances less in the case of smaller melters. All melters are endeavoring to turn inventories into cash.

The H. B. Smith Co., Westfield, Mass., is the most discussed company at the moment due to an announcement that its North plant foundry is to be sold at public auction this week. The company is not going out of business. For some time it has been able to buy radiation castings cheaper than it could make them, and the North plant therefore has become unnecessary.

. . . *American mills may cooperate with Continental Steel Cartel.*

LONDON, Nov. 30 (By cable).— There has been good improvement in pig iron demand since the 1938 prices were announced and considerable sales have been effected for delivery in the first half. Semi-finished position is improving and rerollers are better supplied. Seventy-five thousand tons of Continental semi-finished has been purchased with an option for an additional equal tonnage for first quarter shipment. Heavy steel works are still operating full time despite export lag, and order books are filled for six months.

Shipbuilding orders are increasing. Anglo Saxon Petroleum has placed contracts for eight tankers valued at about £2,000,000.

Viscount Horne, chairman of the Great Western Railway Co., stated that the company is postponing the expenditure of millions until the industry is less active, when prices are expected to fall.

Tin plate market is dull and many mills are openly accepting official minimum price. Unfilled orders amount to 4,000,000 base boxes.

Thin sheet cartel has reaffirmed 1938 export prices. Black and galvanized sheets are quiet.

The Continental Steel Cartel left official prices unchanged as America has given assurance that an attempt will be made to reach an agreement on export prices. A small committee was formed to compare Continental and American prices. The proposed arrangement includes all steel products except thin sheets and tubes.

. . . *Steel output may reach all-time record.*

TORONTO, Nov. 30.—Steel operations in Canada continue with little or no change from the peak levels reached earlier in the year. Mills are maintaining operations close to the capacity mark, while companies associated with the steel industry also report sustained activities.

Pig iron production in Canada during October totaled 80,922 gross tons, the highest rate since January, 1930, when 87,079 tons was reported. For the 10 months ended with October, output amounted to 735,360 tons against 535,836 tons in the corresponding period last year. For the first 10 months of this year, production of steel ingots and direct steel castings totaled 1,191,989 tons, indicating an all-time record this year.

Canadian mills still are well supplied with orders, assuring continuation of the present operating rate to the end of this year. While there has been falling off in export demand for iron, steel and their products, orders for export still run well ahead of those for the previous several years, and it is expected there will be a revival of business of this nature early in the new year.

Steel interests do not look for price revisions in the immediate future.

Continued high operating schedules is responsible for good demand for raw materials. Pig iron sales continue in good volume. The melt is holding at about 70 per cent.

In the scrap market conditions generally are unchanged. Demand for heavy melting steel and turnings is steady and local dealers are making shipments to the Hamilton consumers. Stove plate, machinery cast and wrought scrap have a good call from the foundry consumers and electric furnace operators are in the market for supplies. Scrap offerings from rural districts have been reduced owing to the snow and winter weather in the northern areas.

Seneca Plant Will Be Used For Galvanizing

BUFFALO, Nov. 30.—The plant that has been known as the Seneca sheet division of the Bethlehem Steel Co., located at Blasdell, a short distance from the main plant at Lackawanna, will be converted into a plant for the manufacture of galvanized sheets for containers including baskets and pails.

Before its acquisition by Bethlehem, this plant was the Seneca Iron & Steel Co., maker of steel sheets. When the new Bethlehem strip mill went into production, operations were discontinued at the Seneca division and Bethlehem's entire sheet production in this territory was turned out according to the more modern process. Last year when the demand for steel sheets increased beyond the ability of present facilities, the Seneca plant again was used extensively in the rolling of sheets by the old process.

Hook Heads N.A.M. Resolutions Body

CHARLES R. HOOK, president of the American Rolling Mill Co., Middletown, Ohio, has been appointed chairman of the resolutions committee of the annual Congress of American Industry to be held Dec. 7-8-9 at the Waldorf-Astoria Hotel in New York.

Assisting Mr. Hook will be Elon H. Hooker, president of the Hooker Electrochemical Co., New York, vice-chairman, and a group of other outstanding industrial leaders. The National Association of Manufacturers is sponsoring the convention which will adopt an "industrial viewpoint" following the gathering of more than 1,000 manufacturers from all parts of the country.

. . . . NEW YORK. . . .

. . . No improvement in steel sales; this believed to be low point.

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. . . Structural steel jobs constitute only large tonnages placed.

NEW YORK, Nov. 30.—Structural steel is the only branch of the industry that is furnishing sizable tonnages in the New York district. American Bridge Co. was awarded 1070 tons for public school No. 259, New York; an apartment building at 955 Fifth Avenue, New York, requiring 775 tons, will be erected by Harris Structural Steel Co., which was also awarded 750 tons for an apartment building at Madison Avenue and 80th Street; a wing of the Metropolitan Museum, New York, calling for 150 tons, was awarded to the Weatherly Steel Co., Weatherly, Pa. Building No. 7 of the Rockefeller Center group, requiring 5400 tons, is out for bids. The Wallenstein Construction Co. will build an apartment structure that will take 1300 tons, on which bids have been called for.

Steel business has shown no signs of a pickup. Last week a good many manufacturing plants shut down Wednesday for the Thanksgiving holiday and did not reopen until Monday morning. Orders for steel during the latter part of the week were much smaller than during the first three days. Some companies received more tonnage during the worst period of 1932 than they did last week.

The general feeling is that no change for the better is to be expected before January, and prospects for that month are not as bright as they might be if stocks in the hands of consumers and jobbers were being reduced more rapidly. At their present rate of consumption some buyers have enough steel to last through the first quarter, with some balancing of sizes.

No immediate stimulus is expected from the President's housing program. The fact that he has injected the question of prices of building materials, particularly steel and cement, into the picture may create hesitancy among steel buyers in the expectation that Washington pressure may be exerted on the steel industry toward price adjustments.

Pig Iron

With foundry operations declining and melters concentrating on reducing stocks for the approaching inventory season, new business is very light, consisting of occasional carlots for spot delivery. Shipments have shown little change in volume over the past week and are currently running slightly under the October rate. Approximately 12,000 tons of regular foundry grades of iron for export is pending. Past experience, however, indicates that only a small portion of these proposals will reach the booking stage. Freight increases on coke, effective Dec. 1, have increased delivered by-products prices at Newark and Jersey City from 3c. to 10c. per ton. Delivered quotations at those two points now range from $10.88 to $11.40 per ton.

Reinforced Bars

The only large inquiry during the week was for 925 tons for the New Jersey approach roadway to the Lincoln Tunnel. Outside of 783 tons on the Delaware aqueduct job, which will probably not reach the rolling stage this year, pending tonnages total perhaps 400 tons and are comprised of several highway bridges and various municipal sewer projects.

Plates and Sheets

Tonnages booked by district offices of plate sellers were about 30 to 35 per cent of normal for November, and the business done was in dribbles of a few tons from customers who specify generally in hundreds of tons. One plate seller reported a slight pickup toward the end of the month, the sources being a locomotive builder and refinery equipment fabricators, but no new buying trend is discerned here. December prospects are not bright and a general betterment is not expected until after Jan. 1. The export market is not furnishing the bumper that it might be for declining domestic markets since the prices at which material is being sought are far from attractive. Greek interests are said to have purchased 1000 tons of plates at a price considerably below the domestic market. (2.12c. f.a.s.)

Sheet business is at about the same level as plates. A carload order is something to crow about and generally the lots are measured in thousands of pounds. The present tendency is for both manufacturers and jobbers to reduce inventories as the year draws to a close, and no large scale replenishment of stocks is expected until after the first of the year.

The President's message on housing called attention to a condition that was only too obvious around the metropolitan area, namely that high hourly wage rates and high materials costs had brought whatever there might have been of an incipient 1937 building boom to a standstill. A number of large scale apartment and private home projects were abandoned in mid-summer for this reason, but at least one local group had taken new courage even before the President spoke. On 50 acres around 227th Street in the South Riverdale section of New York City, a syndicate will soon begin erecting 35 apartment houses out of an ultimate group of 60 in a project that will total $50,000,000 and will serve an income group that can pay rentals of $30 to $50 a room.

Structural Contracts Lower In October

STRUCTURAL steel orders booked in October dropped sharply to 4,912 tons from 132,432 tons in September, according to the American Institute of Steel Construction. Total bookings for the first 10 months of this year were 1,381,381 tons, or 60,514 tons above the figure for the first 10 months of 1936.

When compared with bookings, shipments of structural steel were well sustained in October, the total for the month having been 149,308 tons, as compared with 163,541 tons in September. Total shipments for the first 10 months of 1937 amounted to 1,415,403 tons against 1,292,315 tons in the comparable period of 1936.

The backlog of the industry declined from 554.898 tons at the end of September to 452,835 tons at the end of October.

. . PHILADELPHIA . .

. . . Eastern Pennsylvania operations down to 34 per cent.

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. . . Market listlessness into January likely.

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. . . Sellers restrict salesmen's traveling.

PHILADELPHIA, Nov. 30.—Steel consumers' business has been restricted to such an extent that it is likely that many companies will enter the new year with considerably heavier inventories than had been expected a month ago. This inventory situation, together with the normal year-end slackening and a universal customer caution, is naturally resulting in complete market stagnation. The day-to-day business drifting into sales offices is of no moment whatsoever, and more than one company, large and small, is so discouraged concerning immediate prospects that salesmen are being deliberately kept at the home office in order to save traveling expenses.

The Pencoyd producer has taken off two open hearths and is down now to two units; Lukens has four furnaces on; Alan Wood one, Worth one and Central two. For the current week, the average of district operations is four points lower than a week ago, being at 34 per cent of theoretical capacity. More than one plant has good ingot stocks on hand, but in no case has stocking been abnormal. Some mills would just as soon take all open hearths off, but such action is impossible as at least one unit is necessary to take care of the various analyses specified on small-lot orders drifting into the plant over a week's time.

Although railroad buying currently is at a standstill, there is considerable likelihood that the backlog of requisitions now being built up will be released in the new year. Considerable interest has been engendered by the announcement of the Norfolk & Western of a $3,700,000 improvement program, which will include a purchase of 25,000 tons of rails and fastenings.

Pig Iron

A few small-lot orders are coming into the market each week, but for the most part consumers continue to live off inventories, and will undoubtedly continue to do so until well into January. There is a fair amount of contract business on furnace books, but releases on these orders are certainly not in sufficient volume to take care of total foundry melt in this area. Prices are steady. New export inquiry is in good volume, but large price concessions are demanded.

Sheets and Strip

Current deliveries are confined almost entirely to the local autobody stamping plants, and they in turn are not taking nearly the tonnage that was predicted up to even one month ago. There is not a thing in the picture that is encouraging for December, and sellers are only hoping that a little better tone will be established by the middle of January. There are plenty of orders piling up on the desks of railroad purchasing agents, but it is entirely unlikely that any action will be taken on this business until the petitions for higher rates bring favorable action. Prices are steady.

Plates & Shapes

Day-to-day plate turnover is nil. Bids go in on tankers Dec. 1, and there is considerable probability that local shipyards will get at least several boats, perhaps more if Standard Oil follows through with its rumored intention of awarding as high as 10 tankers. One or 10 boats, in either case specifications will not be released until next year and will be spread over at least 12 months. This spreading of tonnage also applies to the requirements for the two Navy battleships, although in this case releases will cover four years. It is evident therefore that these ship tonnages will have little influence on the immediate market picture. The only shapes award of the week of over 100 tons went to Bethlehem, and calls for 270 tons for five sanitarium buildings at Hamburg, Pa. Active tonnages include a 370-ton school at Polk, Pa., and projects to be bid include 150 tons for a medical building at Bethesda, Md., 325 tons for highway bridges in Pennsylvania and 185 tons for a bridge in New Jersey.

Imports

The following iron and steel imports were received here during the past week: 1115 tons of chrome ore from the Philippine Islands; 20 tons of wire rods, 91 tons of steel tubes, 24 tons of steel forgings and 55 tons of steel bars from Sweden; 66 tons of structural shapes from Belgium.

. . BIRMINGHAM . .

. . . General steel demand slow; rail tonnage the one bright spot.

BIRMINGHAM, Nov. 30.—Rail tonnage continues to be the one bright spot in the steel market and has offset the weakness in other products. Additional orders are in prospect.

General steel demand is weak. The expected improvement in sheets and wire products has not materialized. Buying is now on a hand-to-mouth basis and will likely remain that way for the remainder of the year.

Although books for first quarter pig iron have been open several weeks, there is little interest in the next period. There have been a few bookings but the aggregate tonnage is not large. Current shipments of pig iron have slowed down.

Republic Steel Corp. has banked its Gadsden blast furnace, leaving 14 active in the district. Steel production has been stationary for the past two weeks, with 11 units in operation. Tennessee Coal, Iron & Railroad Co. is operating six at Fairfield and three at Ensley; Republic Steel Corp., two at Gadsden. The schedule for next week is the same.

. . .NON-FERROUS. . .

. . . Heavy copper buying abroad; domestic sales light.

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. . . Zinc reduced further to 5.60c., New York.

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. . . Lead market quiet; little activity in tin.

NEW YORK, Nov. 30.—Unusually heavy buying in London, with as high as 15,000 tons reported sold on Monday, was the feature of the week's copper market. Prices on the London exchange were encouraged by the unexpected demand and rose to 10.125c. per lb., c.i.f., usual base ports, yesterday, a gain of 0.415c. over the price of a week ago. This morning the London exchange was off 10 points with demand in smaller volume. Sales for the week in the domestic market amounting to 3245 tons ran in about the same volume as the previous week. Sales for the month through Saturday amounted to 16,237 tons. Domestic electrolytic quotations remain at 10.75c. per lb., Connecticut Valley, with producers quoting 11c. on sales to affiliated fabricators.

The Week's Prices. Cents Per Pound for Early Delivery

	Nov. 24	Nov. 25	Nov. 26	Nov. 27	Nov. 29	Nov. 30
Electrolytic copper, Conn.*	10.75	....	10.75	10.75	10.75	10.75
Lake copper, N. Y.	11.125	....	11.125	11.125	11.125	11.125
Straits tin, spot, New York	41.75	....	41.75	....	42.50	42.50
Zinc, East St. Louis	5.50	....	5.25	5.25	5.25	5.25
Zinc, New York	5.85	....	5.60	5.60	5.60	5.60
Lead, St. Louis	4.85	....	4.85	4.85	4.85	4.85
Lead, New York	5.00	....	5.00	5.00	5.00	5.00

*Delivered Connecticut Valley; price ¼c. lower delivered in New York.
Aluminum, virgin, 99 per cent plus 20.00c.-21.00c. a lb. delivered.
Aluminum No. 12 remelt No. 2 standard, in carloads, 19.00c. to 19.50c. a lb., delivered.
Nickel, electrolytic, 35c. to 36c. a lb. base refinery, in lots of 2 tons or more.
Antimony, Asiatic, 14.75c. a lb., prompt, f.o.b., New York.
Antimony, American, 14.75c. per lb., prompt shipment, New York.
Quicksilver, $83.00 to $85.00 per flask of 76 lb.
Brass ingots, commercial 85-5-5-5, 11.25c. a lb., less carload, delivered in Middle West ¼c. a lb. is added on orders for less than 40,000 lb.

From New York Warehouse

Delivered Prices, Base per Lb.

Tin, Straits pig	43.50c. to 44.50c.
Tin, bar	45.50c. to 46.50c.
Copper, Lake	12.75c. to 13.75c.
Copper, electrolytic	12.75c. to 13.75c.
Copper, castings	12.50c. to 13.50c.
*Copper sheets, hot-rolled	19.125c.
*High brass sheets	17.375c.
*Seamless brass tubes	20.125c.
*Seamless copper tubes	19.875c.
*Brass rods	13.375c.
Zinc, slabs	7.00c. to 8.00c.
Zinc, sheets (No. 9), casks, 1200 lb. and over	12.00c.
Lead, American pig	6.00c. to 7.00c.
Lead, bar	7.25c. to 8.25c.
Lead, sheets, cut	8.50c.
Antimony, Asiatic	18.00c. to 19.00c.
Alum., virgin, 99 per cent plus	22.50c. to 24.00c.
Alum., No. 1 for remelting, 98 to 99 per cent	19.50c. to 21.00c.
Solder, ½ and ½	31.00c. to 33.00c.
Babbitt metal, commercial grade	20.00c. to 60.00c.

*These prices, which are also for delivery from Chicago and Cleveland warehouses, are quoted with 25 per cent allowed off for extras, except copper sheets and brass rods, on which allowance is 40 per cent.

From Cleveland Warehouse

Delivered Prices per Lb.

Tin, Straits pig	46.75c.
Tin, bar	48.75c.
Copper, Lake	12.00c. to 12.25c.
Copper, electrolytic	12.00c. to 12.25c.
Copper, castings	11.50c. to 11.75c.
Zinc, slabs	8.25c. to 8.50c.
Lead, American pig	5.50c. to 5.75c.
Lead, bar	9.00c.
Antimony, Asiatic	17.25c. to 17.75c.
Babbitt metal, medium grade	18.25c.
Babbitt metal, high grade	50.75c.
Solder, ½ and ½	26.50c.

Old Metals, Per Lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators and selling prices are those charged to consumers after the metal has been prepared for their uses. (All prices are nominal.)

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	7.625c.	8.375c.
Copper, hvy. and wire	7.00c.	7.50c.
Copper, light and bottoms	6.00c.	6.25c.
Brass, heavy	4.25c.	4.875c.
Brass, light	3.25c.	4.00c.
Hvy. machine composition	6.75c.	7.25c.
No. 1 yel. brass turnings	4.75c.	5.25c.
No. 1 red brass or compos. turnings	6.50c.	7.00c.
Lead, heavy	4.00c.	4.375c.
Cast aluminum	10.625c.	11.75c.
Sheet aluminum	12.00c.	13.50c.
Zinc	3.00c.	3.375c.

Zinc

Quotations were reduced $5 per ton on Friday to a basis of 5.60c. per lb., New York, for prime Western metal. This is the second cut in less than a week, and it apparently has had little effect in encouraging buying. Prime Western sales for the week, totaling 193 tons, were half the previous week's total. Deliveries also dropped sharply, amounting to 2550 tons, as against 3304 tons in the week previous. Undelivered contracts now stand at 59,189 tons. Today's equivalent of the London spelter price is around 3.43c. per lb., 30 points below last week's price position.

Lead

The domestic market is very quiet, but still showing a steady tone. New business during the week was about 15 per cent below the previous week's volume, and quotations remain unchanged at 5c. per lb., New York. Hand-to-mouth buying still characterizes current sales with the result that over 40 per cent of December's requirements are yet to be covered.

Tin

The week-end stock market rally and the tone of recent news from Washington encouraged the reentry of consumers into the market with the consequence that a substantial volume of business was transacted on Friday and Monday on rising prices. Today the demand tapered off and quotations remain unchanged from yesterday at 42.50c. per lb., New York for Straits metal. Prices in London have been moving sharply in both directions and this morning's quotation on Straits tin for prompt delivery of £185 9s. 15d. represents a net decline of slightly more than £2 from last week's level.

November Average Prices

The average prices of the major non-ferrous metals in November, based on the daily quotations appearing in THE IRON AGE, were as follows:

Electrolytic copper, Connecticut Valley	11.021
Lake copper, eastern delivery	11.864
Straits tin, spot, New York	43.342
Zinc, East St. Louis	5.630
Zinc, New York	5.980
Lead, St. Louis	4.883
Lead, New York	5.033

IRON AND STEEL SCRAP

. . . Bottom seems to have been reached, although consumer buying is still absent.

NOV. 30.—The price decline of the last three months apparently has been halted, although there are no signs of the market getting stronger at least until steel mill operations take a turn upward. Although prices continue to be nominal in the absence of any important sales into consumption, there was no reason to make further modifications downward. For the first time since Aug. 17, no change was made in the price of No. 1 steel at Pittsburgh, Chicago and Philadelphia, and therefore the composite figure remains unchanged at $12.92. Last week, an adjustment upward at Philadelphia to account for export demand counterbalanced losses at Chicago and Pittsburgh, so that actually this is the second week in which no change in the composite was made.

With mill interest still lacking, it is apparent that the stabilizing influence in today's picture is the export trade. Dealers' buying prices at New York, for example, have shown no change for five weeks. Furthermore, export prices at Atlantic ports, by resisting the general downward trend, find themselves on a par with delivered prices in Pittsburgh and make the possibility of a flow of material in that direction more remote. Boston prices have definitely broken loose from a Pittsburgh delivered base.

Pittsburgh

The market is slightly softer than a week ago owing to the continued absence of consumer buying. All scrap prices are purely nominal. A negligible amount of business is being done in No. 1 steel by brokers at around $13 a ton. A few dealers continue to lay down railroad heavy melting and are paying around $14 a ton. Quotations on these grades are unchanged from a week ago. One large steel plant which has embargoes on shipments is allowing the delivery of an exceedingly limited amount of scrap. The restrictions are still such that this action has had no effect on the market. The decline in railroad specialty quotations has been checked for the time being owing to short interests.

Chicago

Brokers are of the opinion that scrap prices have about reached bottom, heavy melting steel remaining at $11.50 to $12 for the second week, and only a few minor reductions being made in other items. No interest is being shown by mills, so prices continue nominal.

Philadelphia

The only semblance of a domestic market is made up of occasional deliveries on old orders, such as sporadic No. 2 deliveries to Alan Wood and Phoenix, a little No. 1 to Lukens and some stove plate to Central. Bethlehem may be considered entirely out of the market. In the absence of any domestic interest, the market here continues to derive its total support from a moderate amount of buying for export. For Port Richmond delivery, prices as high as $14.50 and $13.50 continue to rule for No. 1 and No. 2 respectively. One large Baltimore seller with over 40,000 tons of No. 1 steel available has recently received export bids as high as $16.75 f.o.b., but has no intention of selling.

Cleveland

The market is lifeless, but shows no further signs of weakness, the price decline having apparently been halted. With present prices and reduced production, not much scrap is coming on the market and virtually none is going to the mills. Dealers claim that a slight revival in the demand from consumers would be quickly followed by somewhat firmer prices. However, they are not hopeful of any new consumer demand during the remainder of the year. The New York Central Railroad has less than 2000 tons of heavy melting on its scrap lists for which bids will be taken Dec. 3. The Pennsylvania Railroad has a list of 16,000 tons, of which 5000 tons is heavy melting steel, and the Baltimore & Ohio Railroad is offering 5000 tons of No. 1 heavy melting steel.

Buffalo

This week will see the end of the Lake-borne shipments to Buffalo mills, most of which have sizable stock piles. The largest consumer of the area has indicated that it probably will not buy any more material this year and may not even release shipments during the remainder of 1937. Dealers are laying down scrap, feeling that it is a "good buy" at this time, but there is no flood of material. All prices quoted are strictly nominal.

St. Louis

There having been no trading in scrap iron in the St. Louis scrap iron market during the week, prices are nominally unchanged. Inquiries are being made by some of the mills in the district, indicating that there will be some heavy buying during December for delivery after the turn of the year. Some dealers rejected orders from a mill reported as having made a purchase of 10,000 to 15,000 tons, because of the extension of the time for deliveries from 60 days to 90 days.

Cincinnati

Extreme quiet pervades the old materials market. Occasional transactions reflect only buyer interest in bargains. Dealers bid lower and only take what is necessary for contract and what is attractive in price for yard supplies. Stocks are fair and dealers hesitate to accentuate their long position.

Detroit

More than 900 carloads of scrap from Ternstedt, Buick, Chevrolet, Pontiac, A-C Spark Plug, Saginaw Malleable Iron Foundry and Chrysler plants were thrust on the market this week after more than three weeks of market inactivity. All of the producers estimate less tonnage for December production than in November. As the first of these lists were closed, prices were higher than recent published quotations. The chances of recovery in the local market have been definitely weakened since the major producer of steel is operating only one-third of its open hearths.

New York

Domestic sales are still so limited that prices (on cars) are practically nominal. No broker has named a price on No. 1 steel in a month, but some No. 2 steel was bought locally for around $9 a ton for shipment to Conshohocken, Pa., and some heavy breakable cast has been picked up around $10. The present picture is confused by the fact that prices on material destined for export have remained unchanged for five weeks, leaving a gap of several dollars a ton in some grades, notably Nos. 1 and 2. Export shipments have become freer in recent weeks and while the floating supply on barges is high, it is quite normal. It will probably be after the first of the year before any of the scrap committed for in the last cartel sale begins to leave these shores.

Boston

Two boats have about finished loading, one is scheduled to arrive this week, and more later; consequently the export market is moving along in a more orderly fashion, although as yet new buying by shippers is not active due to previous liberal commitments. Going export prices are the same as a week ago. Schedule individual shipments range from slightly more than 5000 tons to better than 7000. The scrap market for domestic consumption is virtually at a standstill and prices nominal.

Iron and Steel Scrap Prices

PITTSBURGH

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	$13.00 to $13.50
Railroad hvy. mltng.	14.00
No. 2 hvy. mltng. steel.	11.50 to 12.00
Scrap rails	14.00
Rails 3 ft. and under..	18.00 to 18.50
Comp. sheet steel	13.00 to 13.50
Hand bundled sheets..	12.00 to 12.50
Hvy. steel axle turn..	11.50 to 12.00
Machine shop turn.....	7.00 to 7.50
Short shov. turn.	7.00 to 7.50
Mixed bor. & turn.	6.50 to 7.00
Cast iron borings	6.50 to 7.00
Cast iron carwheels....	15.00 to 15.50
Hvy. breakable cast...	12.50 to 13.00
No. 1 cupola cast.....	16.00 to 16.50
RR. knuckles & cplrs.	17.00 to 17.50
Rail coil & leaf springs	17.00 to 17.50
Rolled steel wheels....	17.00 to 17.50
Low phos. billet crops.	17.50 to 18.00
Low phos. sh. bar.....	17.00 to 17.50
Low phos. punchings..	16.00 to 16.50
Low phos. plate, hvy..	17.00 to 17.50
Low phos. plate clips..	14.50 to 15.00
Steel car axles	17.50 to 18.00

PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	$13.50 to $14.00
No. 2 hvy. mltng. steel	12.00 to 12.50
Hydraulic bund., new..	13.50 to 14.00
Hydraulic bund., old...	9.50 to 10.00
Steel rails for rolling..	17.00 to 17.50
Cast iron carwheels...	16.00 to 16.50
Hvy. breakable cast...	14.00 to 14.50
No. 1 cast	16.00 to 16.50
Stove plate (steel wks.)	12.00 to 12.50
Railroad malleable	16.00 to 16.50
Machine shop turn.....	9.00 to 9.50
No. 1 blast furnace ...	8.00 to 8.50
Cast borings	8.50 to 9.00
Heavy axle turnings...	11.00 to 11.50
No. 1 low phos. hvy...	18.00 to 18.50
Couplers & knuckles..	18.00 to 18.50
Rolled steel wheels....	18.00 to 18.50
Steel axles	20.00 to 20.50
Shafting	19.50 to 20.00
No. 1 RR. wrought	16.00 to 16.50
Spec. iron & steel pipe	13.00 to 13.50
No. 1 forge fire	12.00 to 12.50
Cast borings (chem.)..	13.50 to 14.00

CHICAGO

Delivered to Chicago district consumers:

	Per Gross Ton
Hvy. mltng. steel	$11.50 to $12.00
Auto. hvy. mltng. steel alloy free	10.00 to 10.50
No. 2 auto. steel	9.50 to 10.00
Shoveling steel	11.50 to 12.00
Hydraul. comp. sheets.	10.50 to 11.00
Drop forge flashings...	9.00 to 9.50
No. 1 busheling	10.50 to 11.00
Rolled carwheels	15.00 to 15.50
Railroad tires, cut.....	15.25 to 15.75
Railroad leaf springs..	16.00 to 16.50
Steel coup. & knuckles	15.00 to 15.50
Axle turnings	11.00 to 11.50
Coil springs	16.50 to 17.00
Axle turn. (elec.)	11.50 to 12.00
Low phos. punchings..	15.00 to 15.50
Low phos. plates, 12 in. and under	14.50 to 15.00
Cast iron borings	7.00 to 7.50
Short shov. turnings...	7.50 to 8.00
Machine shop turn.	6.00 to 6.50
Rerolling rails	14.25 to 14.75
Steel rails under 3 ft...	14.50 to 15.00
Steel rails under 2 ft...	15.00 to 15.50
Angle bars, steel	14.25 to 14.75
Cast iron carwheels ..	14.25 to 14.75
Railroad malleable	13.75 to 14.25
Agric. malleable	11.25 to 11.75
	Per Net Ton
Iron car axles	18.50 to 19.00
Steel car axles	16.50 to 17.00
No. 1 RR. wrought	9.50 to 10.00
No. 2 RR. wrought ...	10.25 to 10.75
No. 2 busheling, old ...	4.75 to 5.25
Locomotive tires	14.75 to 15.25
Pipes and flues	8.25 to 8.75
No. 1 machinery cast..	11.25 to 11.75
Clean auto. cast.	11.00 to 11.50
No. 1 railroad cast. ...	10.25 to 10.75
No. 1 agric. cast.....	10.25 to 10.75
Stove plate	8.00 to 8.50
Grate bars	8.00 to 8.50
Brake shoes	7.50 to 8.00

YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	$13.00 to $13.50
Hydraulic bundles	12.50 to 13.00
Machine shop turn. ...	10.00 to 10.50

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	$12.50 to $13.00
No. 2 hvy. mltng. steel.	11.50 to 12.00
Comp. sheet steel	12.00 to 12.50
Light bund. stampings.	9.00 to 9.50
Drop forge flashings...	11.50 to 12.00
Machine shop turn. ...	7.50 to 8.00
Short shov. turn.	9.50 to 10.00
No. 1 busheling	11.50 to 12.00
Steel axle turnings ...	10.00 to 10.50
Low phos. billet and bloom crops	18.50 to 19.50
Cast iron borings	9.00 to 9.50
Mixed bor. & turn. ...	9.00 to 9.50
No. 2 busheling	8.50 to 9.00
No. 1 cast	17.00 to 17.50
Railroad grate bars...	8.50 to 9.00
Stove plate	8.00 to 8.50
Rails under 3 ft.	18.00 to 18.50
Rails for rolling	17.00 to 17.50
Railroad malleab'e	16.00 to 16.50
Cast iron carwheels...	15.50 to 16.00

BUFFALO

Per gross ton, f.o.b. consumers' plants:

No. 1 hvy. mltng. steel.	$13.00 to $13.50
No. 2 hvy. mltng. steel.	11.50 to 12.00
Scrap rails	13.00 to 13.50
New hvy. b'ndled sheet	11.50 to 12.00
Old hydraul. bundles..	10.50 to 11.00
Drop forge flashings ..	11.50 to 12.00
No. 1 busheling	11.50 to 12.00
Hvy. axle turnings	11.50 to 12.00
Machine shop turn....	7.00 to 7.50
Knuckles & couplers..	16.50 to 17.00
Coil & leaf springs....	16.50 to 17.00
Rolled steel wheels....	16.50 to 17.00
Low phos. billet crops.	17.50 to 18.00
Shov. turnings	9.50 to 10.00
Mixed bor. & turn.	8.50 to 9.00
Cast iron borings	8.50 to 9.00
Steel car axles	16.50 to 17.00
No. 1 machinery cast..	15.00 to 15.50
No. 1 cupola cast.	14.00 to 14.50
Stove p'ate	12.00 to 12.50
Steel rai's under 3 ft...	17.00 to 17.50
Cast iron carwheels ..	15.00 to 15.50
Railroad malleable	15.00 to 15.50
Chemical borings	10.50 to 11.00

ST. LOUIS

Dealers' buying prices per gross ton delivered to consumer:

Selected hvy. melting.	$13.00 to $13.50
No. 1 hvy. melting....	13.00 to 13.50
No. 2 hvy. melting.....	12.00 to 12.50
No. 1 locomotive tires.	16.00 to 16.50
Misc. stand.-sec. rails.	13.50 to 14.00
Railroad springs	15.00 to 15.50
Bundled sheets	8.00 to 8.50
No. 1 busheling	7.00 to 7.50
Cast bor. & turn.	6.00 to 6.50
Rails for rolling	14.00 to 14.50
Machine shop turn. ...	6.00 to 6.50
Heavy turnings	8.50 to 9.00
Steel car axles	19.50 to 20.00
Iron car axles	21.50 to 22.00
No. 1 RR. wrought	8.00 to 8.50
No. 2 RR. wrought	13.00 to 13.50
Steel rails under 3 ft...	16.00 to 16.50
Steel angle bars	15.00 to 15.50
Cast iron carwheels...	16.50 to 17.00
No. 1 machinery cast...	12.75 to 13.25
Railroad malleable	15.00 to 15.50
No. 1 railroad cast.....	13.25 to 13.75
Stove plate	9.00 to 9.50
Agricul. malleable	10.00 to 10.50
Grate bars	11.25 to 11.75
Brake shoes	10.00 to 10.50

CINCINNATI

Dealers' buying prices per gross ton:

No. 1 hvy. mltng. steel.	$9.50 to $10.00
No. 2 hvy. mltng. steel.	7.50 to 8.00
Scrap rails for mltng...	14.50 to 15.00
Loose sheet clippings..	6.00 to 6.50
Hydrau. b'nd'ed sheets	9.50 to 10.00
Cast iron borings	3.50 to 4.00
Machine shop turn. ...	4.00 to 4.50
No. 1 busheling	8.00 to 8.50
No. 2 busheling	3.00 to 3.50
Rails for rolling	16.50 to 17.00
No. 1 locomotive tires.	13.00 to 13.50
Short rails	17.00 to 17.50
Cast iron carwheels...	11.50 to 12.00
No. 1 machinery cast..	10.50 to 11.00
No. 1 railroad cast.....	9.00 to 9.50
Burnt cast	5.50 to 6.00
Stove plate	5.50 to 6.00
Agricult. malleable ...	10.50 to 11.00
Railroad malleable	12.50 to 13.00
Mixed hvy. cast.	7.50 to 8.00

BIRMINGHAM

Per gross ton delivered to consumers:

Hvy. melting steel	$16.00 to $16.50
Scrap steel rails	17.00
Short shov. turnings...	8.50
Stove plate	10.50
Steel axles	18.00 to 19.00
Iron axles	15.50 to 18.00
No. 1 RR. wrought....	13.00 to 15.00
Rails for rolling	18.00 to 20.00
No. 1 cast	16.00 to 18.00
Tramcar wheels	16.00 to 18.00

DETROIT

Dealers' buying prices per gross ton:

No. 1 hvy. mltng. steel.	$9.00 to $9.50
No. 2 hvy. mltng. steel.	8.00 to 8.50
Borings and turnings..	5.50 to 6.00
Long turnings	5.00 to 5.50
Short shov. turnings..	6.00 to 6.50
No. 1 machinery cast..	11.75 to 12.25
Automotive cast.	12.75 to 13.25
Hvy. breakable cast...	10.25 to 10.75
Hydraul. comp. sheets.	9.50 to 10.00
Stove p'ate	7.50 to 8.00
New factory bushel....	9.00 to 9.50
Old No. 2 busheling ..	5.00 to 5.50
No. 2 busheling (black fender stock)	Nominal
Sheet clippings	6.50 to 7.00
Flashings	8.50 to 9.00
Low phos. plate scrap.	10.50 to 11.00

NEW YORK

Dealers' buying prices per gross ton on cars:

No. 1 hvy. mltng. steel.	$10.00 to $10.50
No. 2 hvy. mltng. steel.	8.50 to 9.00
Hvy. breakable cast ...	9.50 to 10.00
No. 1 machinery cast...	11.50 to 12.00
No. 2 cast	9.50 to 10.00
Stove plate	7.50 to 8.00
Steel car axles	19.00 to 19.50
Shafting	16.00 to 16.50
No. 1 RR. wrought	11.00 to 11.50
No. 1 wrought long ...	10.00 to 10.50
Spec. iron & steel pipe	9.00 to 9.50
Rails for rolling.....	16.00 to 16.50
Clean steel turnings ..	5.00 to 5.50
Cast borings	5.00 to 5.50
No. 1 blast furnace....	5.00 to 5.50
Cast borings (chem.)..	10.00 to 10.50
Unprepar. yard scrap..	5.50 to 6.00

Per gross ton, delivered local foundries:

No. 1 machn. cast.....	$15.50 to $16.00
No. 2 cast.	11.00 to 11.50

BOSTON

Dealers' buying prices per gross ton.

No. 1 hvy. mltng. steel.	$13.30 to $13.80
Scrap rails	13.30 to 13.80
No. 2 steel	12.30 to 12.80
Breakable cast.	12.50 to 13.00
Machine shop turn.....	6.20
Mixed bor. & turn.....	4.60
Bund. skeleton long....	7.95
Shafting	17.50 to 18.00
Cast bor. chemical	8.00 to 8.50

Per gross ton delivered consumers' yards:

Textile cast.	$15.50 to $16.00
No. 1 machine cast.	15.50 to 16.00

PACIFIC COAST

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	$10.50 to $11.00
No. 2 hvy. mltng. steel.	9.50 to 10.00

CANADA

Dealers' buying prices at their yards, per gross ton:

	Toronto	Montreal
No. 1 hvy. mltng. stl...	$14.50	$14.00
No. 2 hvy. mltng. stl..	13.50	13.00
Mixed dealers steel...	12.50	12.00
Scrap pipe	11.75	11.50
Steel turnings	9.75	9.50
Cast borings	11.00	10.50
Machinery cast.	18.00	17.00
Dealers cast.	16.00	15.00
Stove plate	13.00	11.00

EXPORT

Dealers' buying prices per gross ton:

New York, truck lots, delivered, barges.

No. 1 hvy. mltng. steel.	$13.00 to $13.50
No. 2 hvy. mltng. steel.	$11.50 to $12.00
No. 2 cast.	11.00
Stove plate	8.50 to 9.00

Boston on cars at Army Base or Mystic Wharf

No. 1 hvy. mltng. steel.	$13.75 to $14.00
No. 2 hvy. mltng. steel.	12.75 to 13.00
Rails (scrap)	13.75 to 14.00

Philadelphia, delivered alongside boats, Port Richmond

No. 1 hvy. mltng. steel.	$14.00 to $14.50
No. 2 hvy. mltng. steel.	13.00 to 13.50

PRICES ON FINISHED AND SEMI-FINISHED IRON AND STEEL

SEMI-FINISHED STEEL

Billets, Blooms and Slabs

F.o.b. Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham. Prices at Duluth are $2 a ton higher, and delivered Detroit $3 higher.

	Per Gross Ton
Rerolling	$37.00
Forging quality	43.00

Sheet Bars

F.o.b Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

	Per Gross Ton
Open-hearth or Bessemer	$37.00

Skelp

F.o.b. Pittsburgh, Chicago, Youngstown, Buffalo, Coatesville, Pa., Sparrows Point, Md.

	Per Lb.
Grooved, universal and sheared	2.10c.

Wire Rods
(No. 5 to 9/32 in.)

	Per Gross Ton
F.o.b. Pittsburgh or Cleveland	$47.00
F.o.b. Chicago, Youngstown or Anderson, Ind.	48.00
F.o.b. Worcester, Mass.	49.00
F.o.b. Birmingham	50.00
F.o.b. San Francisco	56.00
F.o.b. Galveston	53.00

Rods over 9/32 in. to 47/64 in., inclusive, $5 a ton over base.

BARS, PLATES, SHAPES

Iron and Steel Bars

Soft Steel

	Base per Lb.
F.o.b. Pittsburgh	2.45c.
F.o.b. Chicago or Gary	2.50c.
F.o.b. Duluth	2.60c.
Del'd Detroit	2.60c.
F.o.b. Cleveland	2.50c.
F.o.b. Buffalo	2.55c.
Del'd Philadelphia	2.74c.
Del'd New York	2.79c.
F.o.b. Birmingham	2.60c.
F.o.b. cars dock Gulf ports	2.85c.
F.o.b. cars Pacific Ports	3.00c.

Rail Steel
(For merchant trade)

F.o.b. Pittsburgh	2.30c.
F.o.b. Cleveland, Chicago, Gary or Moline, Ill.	2.35c.
F.o.b. Buffalo	2.40c.
F.o.b. Birmingham	2.45c.
F.o.b. cars dock Gulf ports	2.70c.
F.o.b. cars dock Pacific ports	2.85c.

Billet Steel Reinforcing
(Straight lengths as quoted by distributers)

F.o.b. Pittsburgh	2.55c.
F.o.b. Buffalo, Cleveland, Youngstown, Chicago, Gary or Birmingham	2.60c.
Del'd Detroit	2.70c.
F.o.b. cars dock Gulf ports	2.95c.
F.o.b. cars dock Pacific ports	2.95c.

Rail Steel Reinforcing
(Straight lengths as quoted by distributers)

F.o.b. Pittsburgh	2.40c.
F.o.b. Buffalo, Cleveland, Youngstown, Chicago, Gary or Birmingham	2.45c.
F.o.b. cars dock Gulf ports	2.80c.
F.o.b. cars dock Pacific ports	2.80c.

Iron

F.o.b. Chicago	2.40c.
F.o.b. Pittsburgh (refined)	3.60c.

Cold Finished Bars and Shafting*

	Base per Lb.
F.o.b. Pittsburgh	2.90c.
F.o.b. Cleveland, Chicago and Gary	2.95c.
F.o.b. Buffalo	3.00c.
F.o.b. Detroit	2.95c.

* In quantities of 10,000 to 19,999 lb.

Plates

	Base per Lb.
F.o.b. Pittsburgh	2.25c.
F.o.b. Chicago or Gary	2.30c.
Del'd Cleveland	2.445c.
F.o.b. Coatesville or Spar. Pt.	2.35c.
Del'd Philadelphia	2.435c.
Del'd New York	2.54c.
F.o.b. Birmingham	2.40c.
F.o.b. cars dock Gulf ports	2.65c.
F.o.b. cars dock Pacific ports	2.80c.
Wrought iron plates, f.o.b. Pittsburgh	3.80c.

Floor Plates

	Base per Lb.
F.o.b. Pittsburgh	3.50c.
F.o.b. Chicago	3.55c.
F.o.b. Coatesville	3.60c.
F.o.b. cars dock Gulf ports	3.90c.
F.o.b. cars dock Pacific ports	4.05c.

Structural Shapes

	Base per Lb.
F.o.b. Pittsburgh	2.25c.
F.o.b. Chicago	2.30c.
Del'd Cleveland	2.445c.
F.o.b. Buffalo or Bethlehem	2.35c.
Del'd Philadelphia	2.455c.
Del'd New York	2.5125c.
F.o.b. Birmingham (standard)	2.40c.
F.o.b. cars dock Gulf ports	2.65c.
F.o.b. cars dock Pacific ports	2.80c.

Steel Sheet Piling

	Base per Lb.
F.o.b. Pittsburgh	2.60c.
F.o.b. Chicago or Buffalo	2.70c.
F.o.b. cars dock Gulf or Pacific Coast ports	3.05c.

RAILS AND TRACK SUPPLIES

F.o.b. Mill

Standard rails, heavier than 60 lb., per gross ton	$42.50
Angle bars, per 100 lb.	2.80

F.o.b. Basing Points

Light rails (from billets) per gross ton	$43.00
Light rails (from rail steel) per gross ton	42.00

	Base per Lb.
Spikes	3.15c.
Tie plates, steel	2.30c.
Tie plates, Pacific Coast ports	2.40c.
Track bolts, to steam railroads	4.35c.
Track bolts, to jobbers, all sizes (per 100 counts)	65-5 per cent off list

Basing points on light rails are Pittsburgh, Chicago and Birmingham; on spikes and tie plates, Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; on tie plates alone, Steelton, Pa., Buffalo; on spikes alone, Youngstown, Lebanon, Pa., Richmond, Va.

SHEETS, STRIP, TIN PLATE TERNE PLATE

Sheets

Hot Rolled

	Base per Lb.
No. 10, f.o.b. Pittsburgh	2.40c.
No. 10, f.o.b. Gary	2.50c.
No. 10, del'd Detroit	2.60c.
No. 10, del'd Philadelphia	2.69c.
No. 10, f.o.b. Granite City	2.60c.
No. 10, f.o.b. Birmingham	2.55c.
No. 10, f.o.b. cars dock Pacific ports	2.95c.
No. 10 wrought iron, Pgh.	4.25c.

Hot-Rolled Annealed

No. 24, f.o.b. Pittsburgh	3.15c.
No. 24, f.o.b. Gary	3.25c.
No. 24, del'd Detroit	3.35c.
No. 24, del'd Philadelphia	3.44c.
No. 24, f.o.b. Granite City	3.35c.
No. 24, f.o.b. Birmingham	3.30c.
No. 24, f.o.b. cars dock Pacific ports	3.80c.
No. 24, wrought iron, Pittsburgh	5.15c.

Heavy Cold-Rolled

No. 10 gage, f.o.b. Pittsburgh	3.10c.
No. 10 gage, f.o.b. Gary	3.20c.
No. 10 gage, f.o.b. Detroit	3.30c.
No. 10 gage, del'd Philadelphia	3.39c.
No. 10, f.o.b. Granite City	3.30c.
No. 10 gage, f.o.b. Birmingham	3.25c.
No. 10 gage, f.o.b. cars dock Pacific ports	3.70c.

Light Cold-Rolled

No. 20 gage, f.o.b. Pittsburgh	3.55c.
No. 20 gage, f.o.b. Gary	3.65c.
No. 20 gage, del'd Detroit	3.75c.
No. 20 gage, del'd Philadelphia	3.84c.
No. 20, f.o.b. Granite City	3.75c.
No. 20 gage, f.o.b. Birmingham	3.70c.
No. 20 gage, f.o.b. cars, dock, Pacific ports	4.10c.

Galvanized Sheets

No. 24 gage, f.o.b. Pittsburgh	3.80c.
No. 24, f.o.b. Gary	3.90c.
No. 24, del'd Philadelphia	4.09c.
No. 24, f.o.b. Granite City	4.00c.
No. 24, f.o.b. Birmingham	3.95c.
No. 24, f.o.b. cars, dock, Pacific ports	4.40c.
No. 24, wrought iron, Pittsburgh	6.10c.

Electrical Sheets
(*F.o.b. Pittsburgh*)

	Base per Lb.
Field grade	3.35c.
Armature	3.70c.
Electrical	4.20c.
Special Motor	5.10c.
Special Dynamo	5.80c.
Transformer	6.30c.
Transformer Special	7.30c.
Transformer Extra Special	7.80c.

Base gage changed from 28 to 24 gage. Gage extras are the same as those applying on hot-rolled, annealed sheets with few exceptions.

Silicon Strip in coils—Sheet price plus silicon sheet extra width extras plus 25c. per 100 lb. for coils.

Long Ternes

No. 24, unassorted 8-lb. coating f.o.b. Pittsburgh	4.10c.
F.o.b. Gary	4.20c.
F.o.b. cars, dock, Pacific ports	4.80c.

Vitreous Enameling Stock

No. 20, f.o.b. Pittsburgh	3.50c.
No. 20, f.o.b. Gary	3.60c.
No. 20, f.o.b. Granite City	3.70c.
No. 20, f.o.b. cars dock Pacific ports	4.10c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh, per lb.	3.30c.
No. 28, Gary	3.40c.
No. 28, f.o.b. Granite City	3.50c.
No. 28, cars dock Pacific ports, boxed	4.175c.

Tin Plate

	Base per Box
Standard cokes, f.o.b. Pittsburgh district mill	$5.35
Standard cokes, f.o.b. Gary	5.45
Standard coke, f.o.b. Granite City	5.55

Special Coated Manufacturing Ternes

	Base per Box
F.o.b. Pittsburgh	$4.65
F.o.b. Gary	4.75
F.o.b. Granite City	4.85

Roofing Terne Plate
(*F.o.b. Pittsburgh*)

(Per Package, 112 sheets, 20 x 28 in.)

8-lb. coating I.C.	$12.00
15-lb. coating I.C.	14.00
20-lb. coating I.C.	15.00
25-lb. coating I.C.	16.00
30-lb. coating I.C.	17.25
40-lb. coating I.C.	19.50

Hot-Holled Hoops, Bands, Strip and Flats under ¼ In.

	Base per Lb
All widths up to 24 in., Pittsburgh	2.40c.
All widths up to 24 in., Chicago	2.50c.
All widths up to 24 in., del'd Detroit	2.60c.
All widths up to 24 in., Granite City	2.60c.
All widths up to 24 in., Birmingham	2.55c.
Cooperage stock, Pittsburgh	2.50c.
Cooperage stock, Chicago	2.60c.

Cold-Rolled Strip*

	Base per Lb.
F.o.b. Pittsburgh	3.20c.
F.o.b. Cleveland	3.20c.
Del'd Chicago	3.48c.
F.o.b. Worcester	3.40c.

* Carbon 0.25 and less.

Cold Rolled Spring Steel

		Pittsburgh and Cleveland	Worcester
Carbon	0.25-0.50%	3.20c.	3.40c.
Carbon	.51- .75	4.45c.	4.65c.
Carbon	.76-1.00	6.30c.	6.50c.
Carbon	Over 1.00	8.50c.	8.70c.

Fender Stock

No. 14, Pittsb'gh or Cleveland	3.45c.
No. 20, Pittsb'gh or Cleveland	3.85c.

WIRE PRODUCTS

(Carload lots, f.o.b. Pittsburgh and Cleveland)

To Manufacturing Trade

	Per Lb.
Bright wire	2.90c.
Galvanized wire	2.95c.
Spring wire	3.50c.

Chicago prices on products sold to the manufacturing trade are $1 a ton above Pittsburgh or Cleveland. Worcester and Duluth prices are $2 a ton above, Birmingham $3 above, and Pacific Coast prices $9 a ton above Pittsburgh or Cleveland.

To the Trade

	Base per Keg
Standard wire nails	$2.75
Smoth coated nails	$2.75
Cut nails, carloads	$3.60

	Base per 100 Lb.
Annealed fence wire	$3.15
Galvanized fence wire	3.55
Polished staples	3.45
Galvanized staples	3.70
Barbed wire, galvanized	3.40
Twisted barbless wire	3.40
Woven wire fence, base column.	74
Single loop bale ties, base col....	63

Chicago and Anderson, Ind., mill prices are $1 a ton over Pittsburgh base (on all products except woven wire fence, for which the Chicago price is $2 above Pittsburgh); Duluth, Minn., mill prices are $2 a ton over Pittsburgh, except for woven wire fence, which is $3 over Pittsburgh and Birmingham mill prices are $3 a ton over Pittsburgh.

On wire nails, barbed wire and staples, prices at Houston, Galveston and Corpus Christi, Tex., New Orleans, Lake Charles, La., and Mobile, Ala., are $6 a ton over Pittsburgh.

On nails, staples and barbed wire, prices of $6 a ton over Pittsburgh are also quoted at Beaumont and Orange, Tex.

STEEL AND WROUGHT IRON PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

F.o.b. Pittsburgh only on wrought iron pipe.

Butt Weld

Steel			*Wrought Iron*		
In.	Black	Galv.	In.	Black	Galv.
⅛	52	31	¼ & ⅜	.+13	+35
¼ to ⅜	..55	38½	½	20	1½
½	....59½	49	¾	26	8
¾	....62½	53	1 & 1¼	.30	14
1 to 3	..64½	55½	1½	34	16½
			2	....33½	16

Lap Weld

2	57	47½	2	....26½	10
2½ & 3	..60	50½	2½ to 3½	27½	12½
3½ to 6	..62	52½	4	....29½	16
7 & 8	..61	50½	4½ to 8	..28½	15
9 & 10	..60½	50	9 to 12	..24½	10
11 & 12	..59½	.49			

Butt Weld, extra strong, plain ends

⅛	....50½	36½	¼ & ⅜	.+14	+48
¼ to ⅜	..52½	40½	½	21	4
½	....57½	48½	¾	27	10
¾	....61½	52½	1 to 2	..34	17½
1 to 3	63	55			

Lap Weld, extra strong, plain ends

2	55	46½	2	....29½	13½
2½ & 3	..59	50½	2½ to 4	..35	20½
3½ to 6	..62½	54	4½ to 6	..33½	19
7 & 8	..61½	51	7 & 8	..34½	19½
9 & 10	..60½	50	9 to 12	..28	15½
11 & 12	..59½	49			

On butt-weld and lap-weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card.

Note—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Seamless Steel Commercial Boiler Tubes and Locomotive Tubes

(Net base prices per 100 ft. f.o.b. Pittsburgh in carload lots)

		Cold Drawn	Hot Rolled
1 in. o.d.	13 B.W.G.	$ 9.46	$ 8.41
1¼ in. o.d.	13 B.W.G.	11.21	9.96
1½ in. o.d.	13 B.W.G.	12.38	11.00
1¾ in. o.d.	13 B.W.G.	14.09	12.51
2 in. o.d.	13 B.W.G.	15.78	14.02
2¼ in. o.d.	13 B.W.G.	17.60	15.63
2½ in. o.d.	12 B.W.G.	19.37	17.21
2¾ in. o.d.	12 B.W.G.	21.22	18.85
2¾ in. od.	12 B.W.G.	22.49	19.98
3 in. o.d.	12 B.W.G.	23.60	20.97
4½ in. o.d.	10 B.W.G.	45.19	40.15
3½ in. o.d.	11 B.W.G.	29.79	26.47
4 in. o.d.	10 B.W.G.	36.96	32.83
5 in. o.d.	9 B.W.G.	56.71	50.38
6 in. o.d.	7 B.W.G.	87.07	77.35

Extra for less-carload quantities:

40,000 lb. or ft. or over	Base
30,000 lb. or ft. to 39,999 lb. or ft.	5%
20,000 lb. or ft. to 29,999 lb. or ft.	10%
10,000 lb. or ft. to 19,999 lb. or ft.	20%
5,000 lb. or ft. to 9,999 lb. or ft.	30%
2,000 lb. or ft. to 4,999 lb. or ft.	45%
Under 2,000 lb. or ft	65%

CAST IRON WATER PIPE

Per Net Ton

*6-in. and larger, del'd Chicago.	$55.00
6-in. and larger, del'd New York	53.00
*6-in. and larger, Birmingham.	47.00
6-in. and larger, f.o.b. dock, San Francisco or Los Angeles....	56.00
F.o.b. dock, Seattle	56.00
4-in. f.o.b. dock, San Francisco or Los Angeles	59.00
F.o.b. dock, Seattle	59.00

Class "A" and gas pipe, $3 extra. 4-in. pipe is $3 a ton above 6-in.

Prices for lots of less than 200 tons. For 200 tons and over, 6-in. and larger is $46, Birmingham, and $54 delivered Chicago; and 4-in. pipe, $49, Birmingham, and $58 delivered Chicago.

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
Machine and carriage bolts:	
½ in. x 6 in. and smaller	65 and 5*
Larger and longer up to 1 in.	60 and 10*
1⅛ in. and larger	60 and 5*
Lag bolts	60 and 10*
Plow bolts, Nos. 1, 2, 3 and 7	65 and 5
Hot pressed nuts, and c.p.c. and t nuts, square or hex. blank or tapped:	
½ in. and smaller	65
9/16 in. to 1 in. inclusive	60 and 5
1⅛ in. and larger	60

* Less carload lots and less than full container quantity. Less carload lots in full container quantity, an additional 10 per cent discount; carload lots and full container quantity, still another 5 per cnt discount.

Semi-finished hexagon nuts, U.S.S. and S.A.E.:	
½ in. and smaller	60 and 10
9/16 in. to 1 in. inclusive	60 and 5
1⅛ in. and larger	60
Stove bolts in packages, nuts attached	70
Stove bolts in packages, with nuts separate	70 and 10
Stove bolts in bulk	80

On stove bolts freight is allowed to destination on 200 lb. and over.

Large Rivets

(½-in. and larger)

	Base per 100 Lb.
F.o.b. Pittsburgh or Cleveland	$3.60
F.o.b. Chicago or Birmingham	3.70

Small Rivets

(7/16-in. and smaller)

	Per Cent Off List
F.o.b. Pittsburgh	65 and 5
F.o.b. Cleveland	65 and 5
F.o.b. Chicago and Birmingham	65 and 5

Cap and Set Screws

(Freight allowed up to but not exceeding 65c. per 100 lb. on lots of 200 lb. or more.)

	Per Cent Off List
Milled cap screws, 1 in. dia. and smaller	50 and 10
Milled standard set screws, case hardened, 1 in dia. and smaller	75
Milled headless set screws, cut thread ¾ in. and smaller	75
Upset hex. head cap screws U.S.S. or S.A.E. thread 1 in. and smaller	60
Upset set screws, cup and oval points	75
Milled studs	65

Alloy and Stainless Steel

Alloy Steel Blooms, Billets and Slabs

F.o.b. Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem. Base price, $60 a gross ton.

Alloy Steel Bars

F.o.b. Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton.

Open-hearth grade, base	3.00c.
Delivered, Detroit	3.15c.

S.A.E. Series Numbers	Alloy Differential per 100 lb.
200 (½% Nickel)	$0.35
2100 (1½% Nickel)	0.75
2300 (3½% Nickel)	1.55
2500 (5% nickel)	$2.25
3100 Nickel-chromium	0.70
3200 Nickel-chromium	1.35
3300 Nickel-chromium	3.80
3400 Nickel-chromium	3.20
4100 Chromium-molybdenum (0.15 to 0.25 Molybdenum)	0.55
4100 Chromium-molybdenum (0.25 to 0.40 Molybdenum)	0.75
4600 Nickel-molybdenum (0.20 to 0.30 Mo, 1.50 to 2.00 Ni)	1.10
5100 Chrome steel (0.60-0.90 Cr.)	0.35
5100 Chrome steel (0.80-1.10 Cr.)	0.45
5100 Chromium spring steel	0.15
6100 Chromium-vanadium bar	1.20
6100 Chromium-vanadium spring steel	0.85
Chromium-nickel-vanadium	1.50
Carbon-vanadium	0.85

These prices are for hot-rolled steel bars. The differential for most grades in electric furnace steel is 50c. higher. Slabs with a section area of 16 in. and 2½ in. thick or over take the billet base.

Alloy Cold-Finishd Bars

F.o.b. Pittsburgh, Chicago, Gary, Cleveland or Buffalo, 3.60c. base per lb. Delivered Detroit, 3.75c., carlots.

CORROSION & HEAT RESISTANT ALLOYS

(Base prices, cents per lb., f.o.b. Pittsburgh)

Chrome-Nickel

	No. 304	No. 302
Forging billets	21.25c.	20.40c.
Bars	25c.	24c.
Plates	29c.	27c.
Structural shapes	25c.	24c.
Sheets	36c.	34c.
Hot-rolled strip	23.50c.	21.50c.
Cold-rolled strip	30c.	28c.
Drawn wire	25c.	24c.

Straight Chrome

	No. 410	No. 430	No. 442	No. 446
Bars	18.50c.	19c.	22.50c.	27.50c.
Plates	21.50c.	22c.	25.50c.	30.50c.
Sheets	26.50c.	29c.	32.50c.	36.50c.
Hot strip	17c.	17.50c.	23c.	28c.
Cold stp.	22c.	22.50c.	28.50c.	36.50c.

TOOL STEEL

High speed	80c.
High-carbon-chrome	43c.
Oil-hardening	24c.
Special	22c.
Extra	18c.
Regular	14c.

Prices for warehouse distribution to all points on or East of Mississippi River are 2c. a lb. higher. West of Mississippi quotations are 3c. a lb. higher.

British and Continental

BRITISH

Per Gross Ton
f.o.b. United Kingdom Ports

Ferromanganese, export	£20 Nominal
Tin plate, per base box	22s. 6d. to 23s.
Steel bars, open-hearth	£11
Beams, open-hearth	£11 2s. 6d.
Channels, open-hearth	£11 7s. 6d
Angles, open-hearth	£11 2s. 6d.
Black sheets, No. 24 gage	£15
Galvanized sheets, No. 24 gage	£18 15s.

CONTINENTAL

Per Gross Ton, Gold £, f.o.b. Continental Ports

Billets, Thomas	£5 7s. 6d.
Wire rods, No. 5 B.W.G.	£6 10s.
Steel bars, merchant	£6
Sheet bars	£5 8s. 6d.
Plate ¼ in. and up	£7 7s.
Plate 3/16 in. and 5 mm.	£7 13s.
Sheet, ⅛ in.	£8 9s. 6d.
Beams, Thomas	£5 8s.
Angles (Basic)	£6 2s. 6d
Hoops and strip, base	£6 10s.

IRON AND STEEL WAREHOUSE PRICES

PITTSBURGH*

Per Net Ton

Plates	3.70c.
Structural shapes	3.70c.
Soft-steel bars and small shapes	3.80c.
Reinforcing steel bars	2.75c.
Cold-finished and screw stock:	
Rounds and hexagons	4.15c.
Squares and flats	4.15c.
Hot rolled strip incl. 3/16 in. thick, under 24 in. wide	4.00c.
Hoops	4.50c.
Hot-rolled annealed sheets (No. 24), 10 or more bundles	4.50c.
Galv. sheets (No. 24), 10 or more bundles	5.15c.
Hot-rolled sheets (No. 10)	3.75c.
Galv. corrug. sheets (No. 28), per square (more than 3750 lb.)	$4.48
Spikes, large .....1 to 24 kegs	$3.75

Per Cent Off List

Track bolts, all sizes per 100 count	55
Machine bolts, 100 count	**
Carriage bolts, 100 count	**
Nuts, all styles, 100 count	**
Large rivets, base per 100 lb.	$4.35
Wire, black, soft ann'l'd, base per 100 lb.	3.45c.
Wire, galv. soft, base per 100 lb.	3.85c.
Common wire nails, per keg	3.00c.
Cement coated nails, per keg	3.00c.

On plates, structurals, bars, reinforcing bars, bands, hoops and blue annealed sheets, base applies to orders of 400 to 3999 lb.

* Delivered in Pittsburgh switching district.

** Prices on application.

CHICAGO

Base per Lb.

Plates and structural shapes	3.75c.
Soft steel bars, rounds	3.85c.
Soft steel bars, squares and hexagons	4.00c.
Cold-fin. steel bars:	
Rounds and hexagons	4.30c.
Flats and squares	4.30c.
Hot-rolled strip	4.10c.
Hot-rolled annealed sheets (No. 24)	4.60c.
Galv. sheets (No. 24)	5.25c.
Spikes (keg lots)	$4.40
Track bolts (keg lots)	5.05
Rivets, structural (keg lots)	**4.95
Rivets, boiler (keg lots)	**5.05

Per Cent Off List

Machine bolts and carriage bolts, ½ in. and smaller	60
Lag screws	*55 and 5
Hot-pressed nuts, sq. and hex., tap or blank, ½ by 6 in. and smaller	60
Hex. head cap screws	60
Cut point set screws	75
Flat head bright wood screws	62 and 20
Spring cotters	45
Stove bolts in full packages	72½
Rd. hd. tank rivets, 7/16 in. and smaller	55
Wrought washers	$4.00 off list
Black ann'l'd wire per 100 lb. to mfg. trade (No. 14 and heavier)	$4.55
Com. wire nails, 15 kegs or more, per keg	$3.20
Cement c't'd nails, 15 kegs or more, per keg	$3.20

On plates, shapes, bars, hot-rolled strip and heavy hot-rolled sheets, the base applies on orders of 400 to 3999 lb. All prices are f.o.b. consumers' plants within the Chicago switching district.

* These are quotations delivered to city trade for quantities of 100 lb. or more. For lots of less than 100 lb., the quotation is 60 per cent off. Discounts applying to country trade are 70 per cent off, f.o.b. Chicago, with full or partial freight allowed up to 50c. per 100 lb.

** Base at 100 lb.

NEW YORK

Base per Lb.

Plates, ¼ in. and heavier	4.00c.
Structural shapes	3.97c.
Soft steel bars, round	4.12c.
Iron bars, Swed. charcoal	7.25 to 7.50c.
Cold-fin. shafting and screw stock:	
Rounds and hexagons	4.57c.
Flats and squares	4.57c.
Cold-rolled; strip, soft and quarter hard	3.92c.
Hoops	4.32c.
Bands	4.32c.
Hot-rolled sheets (No. 10)	4.00 to 4.07c.
Hot-rolled ann'l'd sheets (No. 24*)	4.50 to 4.82c.
Galvanized sheets (No. 24*)	4.50 to 5.47c.
Long terne sheets (No. 24)	5.50 to 6.20c.
Armco iron, galv. (No. 24†)	6.25c.
Toncan iron, galv. (No. 24†)	6.25c.
Galvanneal (No. 24†)	6.60c.
Armco iron, hot-rolled annealed (No. 24†)	5.65c.
Toncan iron, hot-rolled annealed (No. 24†)	5.65c.
Armco iron hot-rolled (No. 10†)	4.60c.
Toncan iron, hot-rolled (No. 10†)	4.60c.
Cold-rolled sheets (No. 20) for quantities 400 to 1499 lb.	
Standard quality	5.40c.
Deep drawing	6.05c.
Stretcher leveled	6.05c.
SAE, 2300, hot-rolled	7.82c.
SAE, 3100, hot-rolled	6.37c.
SAE, 6100, hot-rolled, annealed	10.52c.
SAE, 2300, cold-rolled	9.00c.
SAE, 3100, cold-rolled, annealed	8.35c.
Floor plate, ⅛ in. and heavier	5.60c.
Standard tool steel	12.50c.
Wire, black, annealed (No. 9)	4.25c.
Wire, galv. (No. 9)	4.60c.
Tire steel, 1 x ½ in. and larger	4.61c.
Open-hearth spring steel	4.75c. to 10.25c.
Common wire nails, base per keg	3.25c.

Per Cent Off List

Machine bolts, square head and nut: All diameters. Prices on application	
Carriage bolts, cut thread: All diameters. Prices on application	

* No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

† 125 lb. and more.

ST. LOUIS

Base per Lb.

Plates and struc. shapes	3.99c.
Bars, soft steel (rounds and flats)	4.09c.
Bars, soft steel (squares, hexagons, ovals, half ovals and half rounds)	4.24c.
Cold-fin. rounds, shafting, screw stock	4.54c.
Hot-rolled annealed sheets (No. 24)	4.84c.
Galv. sheets (No. 24*)	5.49c.
Hot-rolled sheets (No. 10)	4.09c.
Black corrug. sheets (No. 24*)	4.89c.
2 galv. corrug. sheets	5.54c.
Structural rivets	5.29c.
Boiler rivets	5.39c.

Per Cent Off List

Tank rivets, 7/16 in. and smaller	50
Machine and carriage bolts, lag screws, fitting up bolts, bolt ends, plow bolts, hot-pressed nuts, square and hexagon, tapped or blank, semi-finished nuts; all quantities	60

* No. 26 and lighter take special prices.

PHILADELPHIA

Base per Lb.

*Plates, ¼-in. and heavier	3.90c.
*Structural shapes	3.90c.
*Soft steel bars, small shapes, iron bars (except bands)	4.00c.
‡Reinforc. steel bars, sq. twisted and deformed	3.53c.
Cold-finished steel bars	4.53c.
*Steel hoops	4.35c.
*Steel bands, No. 12 and 3/16 in. incl.	4.10c.
*Spring steel	5.50c.
†Hot-rolled anneal. sheets (No. 24)	4.65c.
†Galvanized sheets (No. 24)	5.30c.
*Hot-rolled annealed sheets (No. 10)	4.00c.
*Diam. pat. floor plates, ¼ in.	5.25c.

These prices are for delivery in Philadelphia trucking area.

* Base prices subject to deduction on orders aggregating 4000 lb. or over.

† For 25 bundles or over.

‡ For less than 2000 lb.

CLEVELAND

Base per Lb.

Plates and struc. shapes	3.86c.
Soft steel bars	3.75c.
†Reinforc. steel bars	2.60c.
‡Cold-finished steel bars	4.30c.
Hot-rolled strip, 6 in. wide and under	4.16c.
Cold-finished strip	3.60c.
Hot-rolled annealed sheets (No. 24)	4.66c.
Galvanized sheets (No. 24)	5.31c.
Hot-rolled sheets (No. 10)	3.91c.
Hot-rolled 3/16 in. 24 to 48 in. wide sheets	3.91c.
Floor plates, 3/16 in. and heavier	5.76c.
*Black ann'l'd wire, per 100 lb.	$3.40
*No. 9 galv. wire, per 100 lb.	3.80
*Com. wire nails, base per keg	2.95

Per Cent Off List

Machine and carriage bolts, small	65 and 5
Large	60 and 10
Nuts, 100 count ½ in. and smaller	65 and 5
9/16 in. to 1 in.	60 and 10

† Outside delivery 10c. less.

* For 5000 lb. or less.

‡ Plus switching and cartage charges and quantity differentials up to 50c.

CINCINNATI

Base per Lb.

Plates and struc. shapes	3.95c.
Floor plates	5.55c.
Bars, rounds, flats and angles	4.05c.
Other shapes	4.20c.
Rail steel reinforc. bars	3.75c.
Hoops and bands, 3/16 in. and lighter	4.25c.
Cold-finished bars	4.50c.
Hot-rolled annealed sheets (No. 24) 3500 lb. or more	4.60c.
Galv. sheets (No. 24) 3500 lb. or more	$5.25
Hot-rolled sheets (No. 10)	4.00c.
Small rivets	55 per cent off list
No. 9 ann'l'd wire, per 100 lb. (1000 lb. or over)	$3.48
Com. wire nails, base per keg:	
Any quantity less than carload	3.20
Cement c't'd nails, base 100-lb. keg	3.50
Chain, lin. per 100 lb.	8.35

Net per 100 Ft.

Seamless steel boiler tubes, 2-in.	$21.80
4-in.	52.45
Lap-welded steel boiler tubes, 2-in.	20.73
4-in.	48.41

BUFFALO

Base per Lb.

Plates	3.92c.
Floor plates	5.52c.
Struc. shapes	3.80c.
Soft steel bars	3.90c.
Reinforcing bars	3.10c.
Cold-fin. flats and sq.	4.35c.
Rounds and hex.	4.35c.
Cold-rolled strip steel	3.79c.
Hot-rolled annealed sheets (No. 24)	4.80c.
Heavy hot-rolled sheets (3/16 in., 24 to 48 in. wide)	3.97c.
Galv. sheet (No. 24)	5.45c.
Bands	4.22c.
Hoops	4.22c.
Heavy hot-rolled sheets	3.97c.
Com. wire nails, base per keg	$3.26
Black wire, base per 100 lb. (2500-lb. lots or under)	4.55c.
(Over 2500 lb.)	4.45c.

BOSTON

Base per Lb.

Channels, angles	4.20c.
Tees and zees, under 3"	4.45c.
H beams and shapes	4.07c.
Plates — Sheared, tank and univ. mill, ¼ thick and heavier	4.08c.
Floor plates, diamond pattern	5.13c.
Bar and bar shapes (mild steel)	4.20c.
Bands 3/16 in. thick and No. 12 ga. incl.	4.40 to 5.40
Half rounds, half ovals, ovals and bevels	5.45c.
Tire steel	5.45c.
Cold-rolled strip steel	3.845c.
Cold-finished rounds, squares and hexagons	4.65c.
Cold-finished flats	4.65c.
Blue annealed sheets, No. 10 ga.	3.90c.
One pass cold-rolled sheets No. 24 ga.	4.50c.
Galvanized steel sheets, No. 24 ga.	5.05c.
Lead coated sheets, No. 24 ga.	6.15c.

Price delivered by truck in metropolitan Boston, subject to quantity differentials.

DETROIT

	Base per Lb.
Soft steel bars	3.49c.
Structural shapes	3.95c.
Plates	3.95c.
Floor plates	5.85c.
Hot-rolled annealed sheets (No. 24)*	4.69c.
Hot-rolled sheets (No. 10)	3.94c.
Galvanized sheets (No. 24)*	5.40c.
Bands and hoops	4.19c.
Cold-finished bars	4.30c.
Cold-rolled strip	3.78c.
Hot-rolled alloy steel (S.A.E. 3100 Series)	6.44c.

Quantity differential on bars, plates, structural shapes, bands, hoops, floor plates and heavy hot-rolled: Under 100 lb., 1.50c. over base; 100 to 399 lb., base plus .50c.; 400 to 3999 lb. base; 4000 to 9999 lb., base less .10c.; 10,000 lb. and over, less .15c.

*Under 400 lb., .50c. over base, 400 to 1499 lb., base; 1500 to 3499 lb., base less .10c; 3500 lb. and over, base less 15c.

Prices delivered by truck in metropolitan Detroit, subject to quantity differentials covering shipment at one time.

Galvanized and hot-rolled annealed may not be combined to obtain quantity deductions.

MILWAUKEE

	Base per Lb.
Plates and structural shapes	3.86c.
Soft steel bars, rounds up to 8 in., flats and fillet angles	3.96c.
Soft steel bars, squares and hexagons	4.11c.
Hot-rolled strip	4.21c.
Hot-rolled annealed sheets (No. 24)	4.71c.
Galvanized sheets (No. 24)	5.36c.
Cold-finished steel bars	4.41c.
Structural rivets (keg lots)	5.16c.
Boiler rivets, cone head (keg lots)	5.26c.
Track spikes (keg lots)	4.61c.
Track bolts (keg lots)	5.81c.
Black annealed wire (No. 6 to No. 9 incl.)	4.05c.
Com. wire nails and cement coated nails 1 to 14 kegs	3.25c.

	Per Cent Off List
Machine bolts and carriage bolts, ½x6 and smaller or shorter	65
Larger and longer up to 1 in., diam.	60-5
1⅛ in. and larger	60
Coach and lag screws	60-5
Hot-pressed nuts, sq. and hex. tapped or blank, 1-199 lb.	50
200 lb. and over:	
½ in. and smaller	62½
9/16 to 1 in.	60
1⅛ in. and over	50

Prices given above are delivered Milwaukee.

On plates, shapes, bars, hot-rolled strip and heavy hot-rolled sheets, the base applies on orders of 400 to 3999 lb. On galvanized and No. 24 hot-rolled annealed sheets the prices given apply on orders of 400 to 1500 lb. On cold-finished bars the prices are for orders of 1000 lb. or more of a size.

ST. PAUL

	Base per Lb.
Mild steel bars, rounds	4.10c.
Structural shapes	4.00c.
Plates	4.00c.
Cold-finished bars	4.55c.
Hot-rolled annealed sheets, No. 24	4.85c.
Galvanized sheets, No. 24	5.50c.

On mild steel bars, shapes and plates the base applies on 400 to 14,999 lb. On hot-rolled sheets, galvanized sheets and cold-rolled sheets base applies on 15,000 lb. and over. Base on cold-finished bars is 1000 lb. and over of a size.

BIRMINGHAM

Bars and bar shapes	$3.85 base	
Structural shapes and plates	3.75 "	
Hot rolled sheets No. 10 ga.	3.80 "	
Hot rolled sheets No. 24 ga.	4.40 "	3500 lb. and over
Galvanized sheets No. 24 ga.	5.05 "	3500 lb. or more
Strip	4.05 "	
Reinforcing bars	3.85 "	
Floor plates	5.96 "	
Cold finished bars	4.91 "	
Machine and carriage bolts	.50 & 10 off list	
Rivets (structural)	$4.60 base	

On plates, shapes, bars, hot rolled strip, heavy hot rolled sheets, the base applies on 400 to 3999 lb. All prices are f.o.b. consumer's plant.

BALTIMORE

	Base per Lb.
Mild steel bars and small shapes	4.00c.
Structural shapes	3.90c.
Reinforcing bars, 5 to 15 tons	3.16c.
Plates	3.90c.
Hot-rolled sheets, No. 10	3.95c.
Bands	4.20c.
Hoops	4.45c.
Special threading steel	4.15c.
Checkered floor plates ¼ in. and heavier	5.50c.
Galvanized sheets, No. 24, 100 bdls. or more	$4.70
Cold-rolled rounds, hexagons, squares and flats, 1000 lb. and more	$4.50

On plates, shapes, bars, hot-rolled strip and heavy hot-rolled sheets the base applies on orders 400 to 3999 lb.

All prices are f.o.b. consumers' plants.

For second zone add 10c. per 100 lb. for trucking.

CHATTANOOGA

	Base per Lb.
Mild steel bars	4.21c.
Iron bars	4.21c.
Reinforcing bars	4.21c.
Reinforcing shapes	4.11c.
Plates	4.11c.
Hot-rolled sheets No. 10	4.16c.
Hot-rolled annealed sheets, No. 24*	4.06c.
Galvanized sheets No. 24*	4.76c.
Steel bands	4.41c.
Cold-finished bars	4.86c.

* Plus mill item extra.

MEMPHIS

	Base per Lb.
Mild steel bars	4.31c.
Shapes, bar size	4.31c.
Iron bars	4.31c.
Structural shapes	4.21c.
Plates	4.21c.
Hot-rolled sheets, No. 10	4.26c.
Hot-rolled annealed sheets, No. 24	4.91c.
Galvanized sheets, No. 24	5.66c.
Steel bands	4.56c.
Cold-drawn rounds	4.80c.
Cold-drawn flats, squares, hexagons	6.80c.
Structural rivets	5.15c.
Bolts and nuts, per cent off list	55
Small rivets, per cent off list	55

NEW ORLEANS

	Base per Lb.
Mild steel bars	4.20c.
Reinforcing bars	3.24c.
Structural shapes	4.10c.
Plates	4.10c.
Hot-rolled sheets, No. 10	4.35c.
Steel bands	4.75c.
Cold-finished steel bars	5.10c.
Structural rivets	4.85c.
Boiler rivets	4.85c.
Common wire nails, base per keg	$3.55
Bolts and nuts, per cent off list	60

PACIFIC COAST

	Base per Lb. San Francisco	Los Angeles	Seattle
Plates, tank and U. M.	4.05c.	4.30c.	4.25c.
Shapes, standard	4.05c.	4.30c.	4.25c.
Soft steel bars	4.20c.	4.30c.	4.45c.
Reinforcing bars, f.o.b. cars dock Pacific ports	2.975c.	2.975c.	3.625c.
Hot-rolled annealed sheets (No. 24)	5.15c.	5.05c.	5.35c.
Hot-rolled sheets (No. 10)	4.30c.	4.50c.	4.50c.
Galv. sheets (No. 24 and lighter)	5.85c.	5.55c.	5.90c.
Galv. sheets (No. 22 and heavier)	6.10c.	5.70c.	5.90c.
Cold-finished steel Rounds	6.80c.	6.85c.	7.10c.
Squares and hexagons	8.05c.	8.10c.	7.10c.
Flats	8.55c.	8.60c.	8.10c.
Common wire nails—base per keg less carload	$3.40	$3.40	$3.40

All items subject to differentials for quantity.

REFRACTORIES PRICES

Fire Clay Brick

	Per 1000 f.o.b. Works
First quality, Pennsylvania, Maryland, Kentucky, Missouri and Illinois	$54.00
First quality, New Jersey	56.00
Select, Ohio	49.00
Second quality, Pennsylvania, Maryland, Kentucky, Missouri and Illinois	49.00
Second quality, New Jersey	51.00
No. 1, Ohio	46.00
Ground fire clay, per ton	8.00

5 per cent trade discount on fire clay brick, except for New Jersey, quoted at net price.

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	$54.00
Chicago District	63.00
Birmingham	54.00
Silica cement per net ton (Eastern)	9.50

5 per cent trade discount on silica brick.

Chrome Brick

	Per Net Ton
Standard f.o.b. Baltimore, Plymouth Meeting and Chester	$49.00
Chemically bonded f.o.b. Baltimore, Plymouth Meeting and Chester, Pa.	49.00

Magnesite Brick

	Per Net Ton
Standard f.o.b. Baltimore and Chester	$69.00
Chemically bonded, f.o.b. Baltimore	59.00

Grain Magnesite

	Per Net Ton
Imported, f.o.b. Baltimore and Chester, Pa. (in sacks)	$45.00
Domestic, f.o.b. Baltimore and Chester, in sacks	43.00
Domestic, f.o.b. Chewelah, Wash.	25.00

RAW MATERIALS PRICES

PIG IRON

No. 2 Foundry

F. o.b. Everett, Mass. $25.75
F.o.b. Bethlehem, Birdsboro and Swedeland, Pa., and Sparrows Point, Md. 25.00
Delivered Brooklyn 27.47
Delivered Newark or Jersey City 26.53
Delivered Philadelphia 25.76
F.o.b. Neville Island, Sharpsville and Erie, Pa.; Buffalo, Youngstown, Cleveland, Toledo and Hamilton, Ohio; Detroit; Chicago and Granite City, Ill. 24.00
F.o.b. Jackson, Ohio 25.75
Delivered Cincinnati 24.27
F.o.b. Duluth 24.50
F.o.b. Provo, Utah 22.00
Delivered San Francisco, Los Angeles or Seattle 26.50
F.o.b. Birmingham* 20.38

* Delivered prices on southern iron for shipment to northern points are 38c. a ton below delivered prices from nearest northern basing point on iron with phosphorus content of 70 and over.

Malleable

Base prices on malleable iron are 50c. a ton above No. 2 foundry quotations at Everett, Eastern Pennsylvania furnaces, Erie and Buffalo. Elsewhere they are the same.

Basic

F.o.b. Everett, Mass. $25.25
F.o.b. Bethlehem, Birdsboro, Swedeland and Steelton, Pa., and Sparrows Point, Md. 24.50
F.o.b. Buffalo 23.00
F.o.b. Neville Island, Sharpsville and Erie, Pa.; Youngstown, Cleveland, Toledo and Hamilton, Ohio; Detroit; Chicago and Granite City, Ill. 23.50
Delivered Cincinnati 24.61
Delivered Canton, Ohio 24.89
Delivered Mansfield, Ohio 25.44
F.o.b. Jackson, Ohio 25.50
F.o.b. Birmingham 19.00

Bessemer

F.o.b. Everett, Mass. $26.75
F.o.b. Bethlehem, Birdsboro and Swedeland, Pa. 26.00
Delivered Boston Switching District 26.50
Delivered Newark or Jersey City 27.53
Delivered Philadelphia 26.76
F.o.b. Buffalo and Erie, Pa., and Duluth 25.00
F.o.b. Neville Island and Sharpsville, Pa.; Youngstown, Cleveland, Toledo and Hamilton, Ohio; Detroit; Chicago .. 24.50
F.o.b. Birmingham 25.00
Delivered Cincinnati 25.61
Delivered Canton, Ohio 25.89
Delivered Mansfield, Ohio 26.44

Low Phosphorus

Basing points: Birdsboro, Pa. Steelton, Pa., and Standish, N. Y. $28.50

Gray Forge

Valley or Pittsburgh furnace ... $23.50

Charcoal

Lake Superior furnace $27.00
Delivered Chicago 30.24

Canadian Pig Iron

Per Gross Ton

Delivered Toronto

No. 1 fdy., sil. 2.25 to 2.75 .... $26.50
No. 2 fdy., sil. 1.75 to 22.25 .... 25.50
Malleable 26.00
Basic 25.50

Delivered Montreal

No. 1 fdy., sil. 2.25 to 2.75 .... $27.50
No. 2 fdy., sil. 1.75 to 2.25 .... 27.00
Malleable 27.50
Basic 27.00

FERROALLOYS

Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans.

Per Gross Ton

Domestic, 80% (carload) $102.50

Spiegeleisen

Per Gross Ton Furnace

Domestic, 19 to 21% $33.00
F.o.b. New Orleans 33.00

Electric Ferrosilicon

Per Gross Ton Delivered

50% (carloads) $69.50
50% (ton lots) 77.00
75% (carloads) 126.00
75% (ton lots) 136.00

Silvery Iron

Per Gross Ton

F.o.b. Jackson, Ohio, 5.00 to 5.50% $27.50

For each additional 0.5% silicon up to 17%, 50c. a ton is added.
The lower all-rail delivered price from Jackson or Buffalo is quoted with freight allowed. Base prices at Buffalo are $1.25 a ton higher than at Jackson.
Manganese, each unit over 2%, $1 a ton additional. Phosphorus 0.75% or over, $1 a ton additional.

Bessemer Ferrosilicon

F.o.b. Jackson, Ohio, Furnace

Per Gross Ton

10.00 to 10.50% $33.50
10.51 to 11.00% 34.00
11.01 to 11.50% 34.50
11.51 to 12.00% 35.00
12.01 to 12.50% 35.50
12.51 to 13.00% 36.00
13.01 to 13.50% 36.50
13.51 to 14.00% 37.00
14.01 to 14.50% 37.50
14.51 to 15.00% 38.00
15.01 to 15.50% 38.50
15.51 to 16.00% 39.00
16.01 to 16.50% 39.50
16.51 to 17.00% 40.00

Manganese 2 to 3%, $1 a ton additional. For each unit of manganese over 3%, $1 a ton additional. Phosphorus 0.75% or over, $1 a ton additional.
Base prices at Buffalo are $1.25 a ton higher than at Jackson.

Other Ferroalloys

Ferrotungsten, per lb. contained W del., carloads, nominally $1.80
Ferrotungsten, lots of 5000 lbs., nominally 1.85
Ferrotungsten, smaller lots, nominally 1.90
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr per lb. contained Cr delivered, in carloads, and contract ..... 10.50c.*
Ferrochromium, 2% carbon ..... 16.50c to 17.00c.*
Ferrochromium, 1% carbon ..... 17.50c. to 18.00c.*
Ferrochromium, 0.10% carbon ..... 19.50c. to 20.00c.*
Ferrochromium, 0.06% carbon ..... 20.00c. to 20.50c.*
Ferrovanadium, del. per lb. contained V. ..... $2.70 to $2.90
Ferrocolumbium, per lb. contained columbium, f.o.b. Niagara Falls, N. Y. $2.50*
Ferrocarbontitanium, 15 to 18% Ti, 7 to 8% C, f.o.b. furnace carload and contract per net ton $142.50
Ferrocarbontitanium, 17 to 20% Ti, 3 to 5% C, f.o.b. furnace, carload and contract, per net ton $157.50
Ferrophosphorus, electric, or blast furnace material, in carloads, f.o.b. Anniston, Ala., for 18%, with $3 unitage, freight equalized with Rockdale, Tenn., per gross ton 63.50
Ferrophosphorus, electric, 24% in carlots, f.o.b. Anniston, Ala., per gross ton with $3 unitage, freight equalized with Nashville, Tenn. 80.00
Ferromolybdenum, per lb. Mo del ..... 95c.
Calcium molybdate, per lb. Mo del ..... 80c.
Silico spiegel, per ton, f.o.b. furnace, carloads $45.00
Ton lots or less, per ton 50.00
Silico-manganese, gross ton, delivered.
3% 101.50
2.50% carbon grade 106.50
2% carbon grade 111.50
1% carbon grade 121.50

* Spot prices are $5 a ton higher. Spot premium on 75 per cent ferrosilicon is $10 a ton.

ORES

Lake Superior Ores

Delivered Lower Lake Ports

Per Gross Ton

Old range, Bessemer, 51.50% $5.25
Old range, non-Bessemer, 51.50% 5.10
Mesabi, Bessemer, 51.50% 5.10
Mesabi, non-Bessemer, 51.50% .. $4.95
High phosphorus, 51.50% 4.85

Foreign Ore

C.i.f. Philadelphia or Baltimore

Per Unit

Iron, low phos., copper free, 55 to 58% dry, Algeria, nominal. 17.00c.
Iron, low phos., Swedish, average, 68½% iron ..... Nominal
Iron, basic or foundry, Swedish, aver. 65% iron ..... Nominal
Iron, basic or foundry, Russian, aver. 65% iron ..... Nominal
Man., Caucasian, washed 52% ..... 50c.
Man., African, Indian, 44-48% ..... Nominal
Man., African, Indian, 49-51% ..... Nominal
Man., Brazilian, 46 to 48½% ..... Nominal

Per Net Ton Unit

Tungsten, Chinese, wolframite, duty paid, delivered $22.50
Tungsten, domestic, scheelite delivered ..... $23.50 to $25.50
Chrome ore (lump) c.i.f. Atlantic Seaboard, per gross ton:
South African (low grade) $16.00
Rhodesian, 45% 22.00
Rhodesian, 48% 25.50
Turkish, 48-49% .... 25.00 to $26.00
Turkish, 45-46% .... 23.00 to 23.50
Turkish, 44% ..... 19.00 to 19.50
Chrome concentrates (Turkish) c.i.f. Atlantic Seaboard, per gross ton:
50% ..... $25.50 to $26.50
48-49% ..... 24.50 to 25.00

FLUORSPAR

Per Net Ton

Domestic, washed gravel, 85-5, f.o.b. Kentucky and Illinois mines, all rail $20.00
Domestic, barge and rail 21.50
No. 2 lump, 85-5, f.o.b. Kentucky and Illinois mines 22.00
Foreign, 85% calcium, fluoride, not over 5% silicon, c.i.f. Atlantic ports, duty paid 24.50
Domestic No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silicon, f.o.b. Illinois and Kentucky mines 31.50

FUEL OIL

Per Gal.

F.o.b. Bayonne or Baltimore, No. 3 distillate ..... 5.25c.
F.o.b. Bayonne or Baltimore, No. 4 industrial ..... 5.25c.
Del'd Ch'go, No. 3 industrial 4.15c.
Del'd Ch'go, No. 5 industrial 4.00c.
Del'd Cleve'd, No. 3 distillate. 5.875c.
Del'd Cleve'd, No. 4 industrial 5.75c.
Del'd Cleve'd, No. 5 industrial 4.75c.

COKE AND COAL

Coke *Per Net Ton*

Furnace, f.o.b. Connellsville, Prompt ..... $4.25 to $4.50
Foundry, f.o.b. Connellsville, Prompt ..... 5.00 to 6.25
Foundry, by-product, Chicago ovens 10.25
Foundry, by-product, del'd New England 12.50
Foundry, by-product, del'd Newark or Jersey City ..... 10.88 to 11.40
Foundry, by-product, Philadelphia 10.95
Foundry, by-product, delivered Cleveland ... 11.05
Foundry, by-product, delivered Cincinnati ... 10.50
Foundry, Birmingham .. 7.50
Foundry, by-product, del'd St. Louis industrial district ..... 11.00 to 11.50
Foundry, from Birmingham, f.o.b. cars dock, Pacific ports 14.75

Coal *Per Net Ton*

Mine run steam coal, f.o.b. W. Pa. mines ... $1.50 to $1.75
Mine run coking coal, f.o.b. W. Pa. ..... 1.75 to 1.90
Gas coal, ¾-in. f.o.b. Pa. mines ..... 2.00 to 2.25
Mine run gas coal, f.o.b. Pa. mines ..... 1.80 to 2.00
Steam slack, f.o.b. W. Pa. mines ..... 1.00 to 1.25
Gas slack, f.o.b. W. Pa. mines ..... 1.20 to 1.45

FABRICATED STEEL

. . . Lettings advance to 11,750 tons from 6500 tons last week.

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. . . New projects in smaller volume at 14,000 tons as against 22,600 tons a week ago.

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. . . Plate awards call for 2275 tons.

NORTH ATLANTIC STATES

State of Vermont, 164 tons, bridges for Department of Agriculture, to Phoenix Bridge Co., Phoenixville, Pa.

Durham, N. H., 210 tons, field house and cage, University of New Hampshire, to American Bridge Co.

New York, 1070 tons, public school No. 259, to American Bridge Co.

New York, 540 tons, grains storage building, John Eichler Brewing Co., to Harris Structural Steel Co., Plainfield, N. J.

New York, 775 tons, apartment building, 955 Fifth Avenue, to Harris Structural Steel Co., Plainfield, N. J.

New York, 150 tons, wing A, Metropolitan Museum of Art, to Weatherly Steel Co., Weatherly, Pa.

New York, 750 tons, apartment building, Madison Avenue and 80th Street, to Harris Structural Steel Co.

Peekskill, N. Y., 730 tons, Standard Brands boiler house, to Belmont Iron Works, Philadelphia.

Lakehurst, N. J., 200 tons, bridge for Central Railroad of New Jersey, to Bethlehem Steel Co.

Woodbridge, N. J., 260 tons, State grade crossing elimination, to American Bridge Co.

Pittsburgh, 1000 tons, women's wing, University Hospitals, to Bethlehem Steel Co.

Hamburg, Pa., 270 tons, five sanatorium buildings, to Bethlehem Steel Co.

THE SOUTH

Winifrede Junction, W. Va., 260 tons, State overpass, to Bethlehem Steel Co.

Clemson, S. C., 950 tons, building for Clemson College, to Bethlehem Steel Co.

Cleveland County, Okla., 245 tons, bridge, to J. B. Klein Iron & Foundry Co., Oklahoma City.

Noble County, Okla., 190 tons, bridge, to J. B. Klein Iron & Foundry Co.

Cotulla, Tex., 465 tons, bridge, to Virginia Bridge Co., Roanoke, Va.

CENTRAL STATES

Knox County, Ohio, 200 tons, State highway bridge, to Bethlehem Steel Co.

Indiana Harbor, Ind., 295 tons, Rust Furnace Co., to Joseph T. Ryerson & Son, Inc., Chicago.

Edgerton, Wis., 575 tons, highway bridge, to Bethlehem Steel Co.

Milwaukee, 427 tons, Northwestern Railroad bridge, to Bethlehem Steel Co.

Wiscona, Wis., 490 tons, railroad bridge, to Bethlehem Steel Co.

Aberdeen, S. D., 145 tons, Montgomery Ward building, to Crown Iron Works Co., Minneapolis.

Alvord, Mo., 500 tons, highway bridge, to Missouri Valley Bridge & Iron Co., Leavenworth, Kan.

Paola, Kan., 255 tons, bridge, to St. Joseph Structural Steel Co., St. Joseph, Mo.

South Omaha, Neb., 120 tons, power house, Omaha Steel Works, Omaha, Neb.

WESTERN STATES

Columbia Falls, Mont., 400 tons, State highway bridge, to Minneapolis-Moline Power Implement Co., Minneapolis.

Salinas, Calif., 100 tons, Pacific Telephone & Telegraph Co. building, to Golden Gate Iron Works, San Francisco.

NEW STRUCTURAL STEEL PROJECTS

NORTH ATLANTIC STATES

New York, 1300 tons, apartment building, Wallenstein Construction Co.

New York, 5400 tons, building No. 7, Rockefeller Center.

Auburn, N. Y., 180 tons, State bridge.

Auburn, 150 tons, theater building, Schine Theater Enterprises.

Caledonia, N. Y., 150 tons, central school; bids Dec. 10.

State of New Jersey, 185 tons, bridge, route 35, section 12; bids Dec. 13.

Columbia County, Pa., 220 tons, highway bridge; bids Dec. 10.

Elk County, Pa., 105 tons, highway bridge; bids Dec. 10.

Braddock, Pa., 400 tons, Junior High School.

Ford City, Pa., 350 tons, Crooked Creek dam, United States Engineer Office.

Hunter, Pa., 250 tons, Tionesta dam, United States Engineer Office.

Nanticoke, Pa., 100 tons, high school; bids Dec. 2.

Bethesda, Md., 150 tons, United States National Institute of Health building; bids Dec. 2.

THE SOUTH

Calhoun, S. C., 550 tons, textile building.

Natchez, Miss., 635 tons, Armstrong Rubber Co. building.

Beaumont, Tex., 575 tons, wharf.

CENTRAL STATES

Bay City, Mich., 1000 tons, Lafayette Avenue bridge; bids Dec. 9.

Lawrenceburg, Ind., 300 tons, Seagram distillery.

Poland, Ind., 150 tons, highway bridge; bids Dec. 7.

White Cloud, Ind., 200 tons, highway bridge; bids Dec. 7.

Hillsdale, Ind., 165 tons, bridge.

Springfield, Ill., 900 tons, Lakeside Power plant boiler house.

Burlington, Iowa, 150 tons, auditorium; bids Dec. 11.

St. Louis, 100 tons, signal and refuge bay platform for municipal bridge; List & Weatherly, Kansas City, Mo., low bidders on general contract.

WESTERN STATES

Denver, 120 tons, Silver Roberts Iron Works shop building.

Los Angeles, 100 tons, Armstrong Cork Co. plant; bids opened.

Vernon, Calif., 300 tons, Swift & Co. packing plant; bids opened.

FABRICATED PLATES

AWARDS

Paducah, Ky., 540 tons, two car floats, Nashville, Chattanooga & St. Louis Railway Co., to Nashville Bridge Co., Nashville.

Pittsburgh, 532 tons, two oil barges for Campbell Transportation Co., to Dravo Corp., Pittsburgh.

Chicago, 1200 tons, Socony-Vacuum Oil Co. tanker, to an unnamed Chicago mill.

NEW PROJECTS

Tacoma, Wash., 500 tons, 36 and 48-in. pipe, bids to be taken by Board of Contracts and Awards, Dec. 6.

Coulee City, Wash., about 8000 tons, penstocks and pump inlet pipes for Grand Coulee Dam; bids to be taken by Bureau of Reclamation, Denver, Jan. 6.

SHEET PILING

AWARDS

Los Angeles, Metropolitan Water District, 1200 tons, Schedule No. 1, to Anchor Post Fence Co., $187,916; Schedule No. 2, to Pittsburgh Steel Co., $161,540; Schedule Nos. 3, 4, and 5, to Los Angeles Fencing Co., $63,620. Bids include 1180 tons of fence fabric, and 150 tons of barbed and plain wire.

New Power Plant Opened At Chicago

CARNEGIE-ILLINOIS STEEL CORP. will soon complete and put into operation a new power station, No. 5, at its South Works in Chicago. This station will replace older equipment and will provide for future expansion and, to a certain extent, centralize power facilities.

Surplus blast furnace gas will be used as primary boiler fuel with natural gas and oil as secondary fuels. Provisions have also been made to use pulverized coal for secondary fuel after the bulk of the surplus blast furnace gas has been utilized for metallurgical purposes. The yard layout and building design provides not only for storage, handling and pulverizing facilities, but also for dust collectors to prevent the discharge of flyash from the stacks.

THIS WEEK'S MACHINE . . .TOOL ACTIVITIES. . .

. . . November orders showed a falling off from October and December volume will probably be light.

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. . . Inquiries point to a fairly active first quarter.

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. . . Foreign orders, in multiple tool lots, tend to sustain machinery production.

Chicago

MACHINE tool sales offices in this district report that business in the past week has continued on the downgrade. Such infrequent orders as have come in during the period have been to finish up equipment buying programs for the year. Expectations in the trade are that no improvement can be expected before the start of the new year. The general opinion still exists that there is a large potential demand which will make its appearance as soon as the recession in industrial production runs itself out. Practically throughout the trade, this recession is regarded as only a temporary interruption in the recovery curve of the business cycle. Meanwhile, shipments are still being made in comparatively heavy volume, and backlogs still are large enough to assure a favorable rate of operations into the first quarter of next year. Leading interests in the trade find that their customers are encouraged by the recent intimations from Washington that action might be taken to relieve the severity of the surtax on undistributed profits.

Cleveland

NOVEMBER was a disappointing month in the machine tool industry. Business with manufacturers and dealers fell off as compared with October, although one manufacturer of automatic screw machinery did better in November than during the previous month. With the scarcity of new orders, the past week has shown little change in the situation although a manufacturer of turret lathes is encouraged by an increase of business in prospect. Deliveries continue to improve, but most manufacturers still have enough orders to keep their plants running at capacity for several weeks.

As few buyers of machinery will consider making purchases before January, the outlook for any gain in business this month is not promising. Chesapeake & Ohio Railroad took bids Nov. 29 for several machines for its Huntington, W. Va., shops. Foreign inquiry continues active from Japan, Russia, England and France, and some manufacturers with domestic sales exceedingly light are glad to fill out their order books with sales for export.

Detroit

WINDING up the last quarter, machine tool activity was at its lowest stage in more than two years insofar as orders or inquiries are concerned, although backlogs are still large enough in most cases to warrant continued normal production. A better tone has resulted from news of Ford's plans for a consolidated tool and die shop at the Rouge. This will be 300 x 1225 ft. and together with additional foundry facilities that are scheduled, will result in a new buying wave at Ford Motor. In addition, Ford's go-ahead signal to suppliers will bring about a resumption in perishable tool purchases.

Cincinnati

THERE appears to be no change in the rate of business in the local machinery market. While there has been a recession from first half briskness in keeping with changes in other areas, ordering at an encouraging rate is being maintained. Some manufacturers report new business near to estimated normal, while others report substantially less. On the whole, however, a market average of about 45 per cent is being maintained. Domestic interest has definitely waned so far as orders are concerned, but inquiry is still reported active. Foreign business, however, tends upward. Several manufacturers reported substantial multiple unit orders from foreign countries, although detailed data are withheld. Inquiry by way of plant visitations of representatives of foreign countries also is reported to be brisk.

Pittsburgh

MACHINE tool orders during the past week were only fair. The volume of business during November was somewhat below that booked in October. There is, however, a good chance that December orders will show an improvement. Normally, there is a year-end clean-up of unexpended appropriations. Regular inquiries have shown no particular change, but customers are still requesting data for estimating and budget purposes. Kelsey-Hayes Wheel plant to be built at Neville Island, Pittsburgh, has been temporarily held up owing to present business conditions, but the project is very definite and the delay is not expected to be a long one. Inquiries are already out on structural material.

New York

BUSINESS during the holiday week was quiet and rather spotty. A couple of large orders running up to $100,000 were reported, but they were placed through one dealer and came from only two sources. Other orders were almost completely absent, with the exception of a substantial volume of automatic screw machines, a line in which inquiries have been more active than the general run of machine tools. These particular machines were bought for replacement purposes and had been up for consideration for some time.

While some dealers are actively engaged in quoting, it is not expected that much of this paper work will resolve itself into orders in December, now looked to as possibly the lowest month of the year. A year ago a record-breaking volume of orders was booked, largely because of upward revisions in price that became effective on Jan. 1.

COMING CONVENTIONS

Dec. 6 to 10 — Personal Research Federation, Hotel New Yorker, New York. C. S. Slocombe, 29 West 39th Street, New York, director.

Dec. 6 to 11—Society for the Advancement of Management, Hotel New Yorker, New York. Headquarters of the society is at 29 West 39th Street, New York.

Dec. 6 to 11—Exposition of Chemical Industries, Grand Central Palace, New York.

Jan. 12 to 14—Institute of Scrap Iron and Steel, Ambassador Hotel, Atlantic City, N. J. B. H. Rubine, Hudson Iron & Metal Co., Bayonne, N. J., is in charge of arrangements.

Jan. 24 to 28—International Heating and Ventilating Exposition, Grand Central Palace, New York.

Consumable Pallets Save Rehandling

THE manufacture of zinc caps for fruit jars at the plant of Ball Brothers Co., Muncie, Ind., requires the receiving, unloading, storage and handling through production of a very large tonnage of zinc spelter each year. Formerly this zinc spelter was cast by the supplier in flat fifty-pound slabs, which, on arrival at Muncie had to be removed piece by piece by hand from the freight cars, stacked on wooden skids in loads of approximately two thousand pounds per skid, removed to storage by a lift truck, and when required for production, picked up once more by a lift truck and taken to the melting furnace, where each slab was again manhandled in tossing it into the pot.

Recently engineers of the Ball Brothers Co., cooperating with the supplier, developed a design of interlocking load slab with a consumable pallet cast from the zinc having a base arranged to provide entry underneath the lifting forks of a Yale lift tilting fork truck. The supplier now ships the zinc spelter in these new slabs stacked in thirty-pallet loads weighing two thousand pounds each per freight car. The fork truck goes directly into the freight car, picks up a complete pallet load at a time, and removes them to storage. As the metal is required in production, the same fork truck picks up a complete pallet load from storage and takes it to the melting pot, where the entire load, including the skid-formed base section, is dumped into

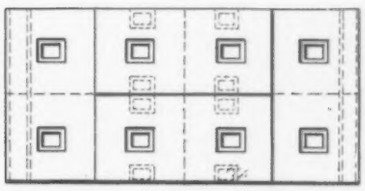
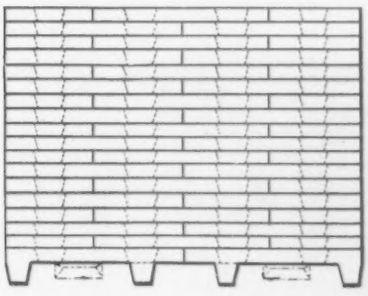


FIG. 1—Diagram of the present method of molding the zinc slabs to form base pallet pigs, and upper interlocking pile pigs.



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AT RIGHT

FIG. 2—The zinc spelter is shipped to the user in metal-strapped piles, interlocked and with self-formed consumable pallet.

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FIG. 3—Yale tilting fork trucks pick up a 2,000 lb. pile of slabs at one time for removal from the freight car to storage.

the pot without any separate handling of the slabs.

Ball Brothers Co. estimates a direct saving of $18 a car in unloading by this method, as well as greatly increased storage capacity due to the fact that the new unit pallet loads are stacked one on top of each other, and a considerable saving in the handling of slabs from storage to melting pot as well as the elimination of the cost of buying and maintaining skid platforms. The possibility of accidental injury to workmen from slabs falling off a skid load in transit has been eliminated, since the slab interlocking feature now holds each pile together even when jolting over rough surfaces.

The accompanying illustrations make the facts clear. Fig. 1 is a drawing which shows how the zinc is molded by the supplier into bottom-slab pallet pigs, and into upper-slab interlocking pigs. In Fig. 2 several stacks of slabs are shown as they are stored in the freight cars for shipment to Muncie, each stack held together with two metal straps. Fig. 3 shows the fork truck taking one pile out of the freight car to storage and Fig. 4 shows how the piles are stacked three high for storage purposes.

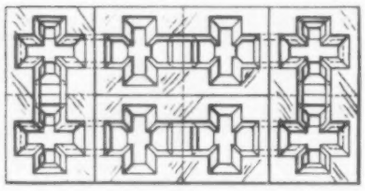
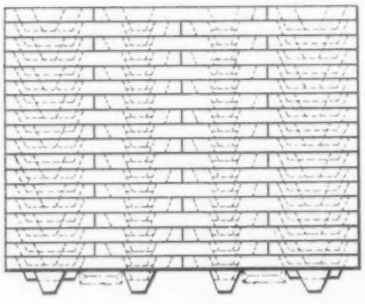


FIG. 6—An improved design for molding the slabs. One molded form serves both for consumable pallet and pile interlocking. Developed by Yale & Towne.



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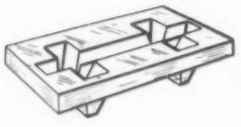
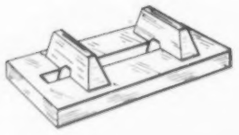
ABOVE

FIG. 4—With shipping straps removed, each 2,000 lb. pile of slabs is stacked for temporary storage purposes, in three-high stacks.





In Fig. 5 a unit pile of slabs is being weighed, on the way from storage to the melting pot.

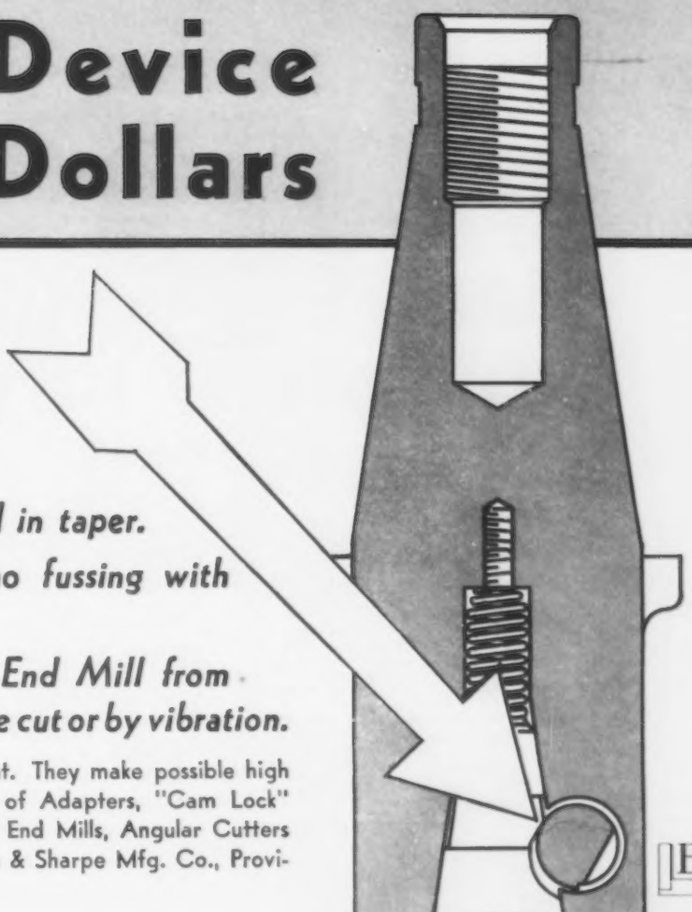
This idea of molding metal slabs into interlocking shapes and base pallets might be readily extended to the handling of other metals, so that with a consumable pallet the cost of the usual wooden pallets can be eliminated. An improved design of interlocking pig in which a single molded form serves for both base pallet and pile interlocking, as worked out by Yale & Towne Mfg. Co. engineers, is shown in Fig. 6.

o o o

AT RIGHT

FIG. 5—On the way from storage to the melting pot, each pile is weighed. With the consumable pallet, the weight is entirely net.

This Simple Device Saves Many Dollars



By actual stop watch tests "Cam Lock" End Mills reduce the time required to change mills by more than half, and they have the following exclusive advantages:

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2. *Quick release — there is no fussing with a sticking End Mill.*
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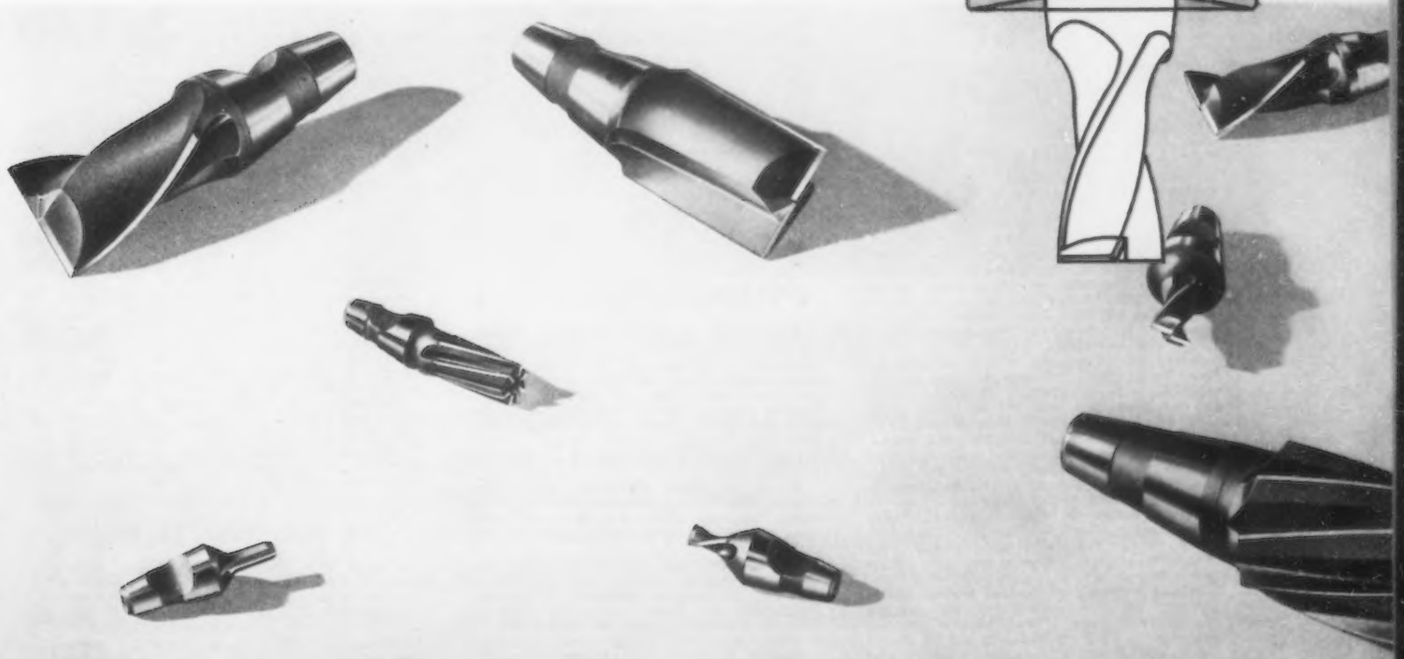
Specify Brown & Sharpe "Cam Lock" End Mills and Equipment. They make possible high production rates and provide real savings. Through the use of Adapters, "Cam Lock" Equipment also accommodates Shell End Mills, Straight Shank End Mills, Angular Cutters and certain hole-type cutters. Ask for Catalog No. 32. Brown & Sharpe Mfg. Co., Providence, R. I., U. S. A.



BROWN & SHARPE CUTTERS

PLANT EXPANSION AND EQUIPMENT BUYING

NORTH ATLANTIC

Electro Metallurgical Co., 30 East Forty-second Street, New York, has purchased about 300-acre tract near Sheffield, Ala., about one and one-half miles from Wilson Dam, for new plant for production of calcium chloride, ferro-silicates and allied products. Plant will include electric power substation, boiler house, machine shop and other mechanical divisions. It will be electric-operated, with power secured from Federal hydroelectric development at Wilson Dam, through TVA. Cost close to $5,000,000.

John Eichler Brewing Co., 3582 Third Avenue, New York, has filed plans for eight-story addition, 32 x 49 ft., for storage and distribution. Cost about $80,000 with equipment. Harley & Ellington, Inc., Stroh Building, Detroit, is architect and engineer.

Magnus Metal Division of National Lead Co., 111 Broadway, New York, has let general contract to Austin Co., New York and Cleveland, for new one-story plant at Colonie, N. Y. Cost close to $100,000 with equipment.

Signal Corps Procurement District, Army Base, Fifty-eighth Street and First Avenue, Brooklyn, asks bids until Dec. 14 for aluminum alloy boxes in lots of 100 to 400 (Circular 72).

Department of Purchase, Municipal Building, New York, plans one-story equipment storage and distributing building, 55 x 130 ft., at Dreyer, Hill and Laurel Avenues, Long Island City. Cost about $70,000 with equipment.

General Electric Co., Schenectady, N. Y., has awarded structural steel contract to American Bridge Co., New York, for one-story and basement addition to branch plant at Pittsfield, Mass., 80 x 500 ft. Cost over $200,000 with equipment.

Department of Hospitals, 125 Worth Street, New York, has plans for extensions and improvements in three-story power plant at 288-302 Jackson Street, Brooklyn. Cost about $35,000. John Russell Pope and Daniel P. Higgins, 542 Fifth Avenue, New York, are architects.

Board of Education, 500 Park Avenue, New York, plans manual training department in new multi-story William Cullen Bryant High School at Long Island City. Cost about $1,400,000. Wilaka Construction Co., Inc., 384 East 149th Street, Bronx, New York, has contract for superstructure. W. C. Martin, Flatbush Avenue Extension and Concord Street, Brooklyn, is architect and superintendent of schools.

Signal Property Officer, Signal Corps Laboratories, Fort Monmouth, Oceanport, N. J., asks bids until Dec. 6 for nine cable assemblies, cable studs, etc. (Circular 12.)

Inland Division of General Motors Corp., Dayton, Ohio, manufacturer of steering wheels, motor parts, etc., has let general contract to Andrew Christensen, 80 Broad Street, Elizabeth, N. J., for two-story and basement plant, 250 x 450 ft., near Cranford, N. J., including one-story power house adjoining, 70 x 180 ft. Cost close to $500,000 with equipment. Albert Kahn, Inc., New Center Building, Detroit, is architect and engineer.

E. Bilhuber, Inc., 154 Ogden Avenue, Jersey City, N. J., manufacturer of drugs and chemicals, has plans for new three-story plant at Orange, N. J., totaling about 36,000 sq. ft. Cost close to $85,000 with equipment.

York Corrugating Co., York, Pa., manufacturer of sheet metal stampings, etc., has arranged for stock issue to total close to $591,000, part of proceeds to be used for additions and purchase of machinery for expansion.

Board of Education, Administration Building, Parkway and Twenty-first Streets, Philadelphia, plans manual training department in new one and three-story central high school on Ogontz Avenue for which building permit has been issued. Cost about $1,400,000.

Singer Sewing Machine Co., 928 Chestnut Street, Philadelphia, has let general contract to Turner Construction Co., Architects' Building, for three-story plant at 128-32 North Twelfth Street. Cost about $85,000 with equipment. B. Rush Stevens, 1827 Arch Street, is architect.

BUFFALO DISTRICT

Keystone Pipe Line Co., 260 South Broad Street, Philadelphia, a subsidiary of Atlantic Refining Co., has let general contract to Alexander, Shumway & Utz Co., 80 South Fitzhugh Street, Rochester, N. Y., for new bulk oil storage and distribution terminal at Wayland, N. Y., to be connected with welded steel pipe line recently built from Williamsport, Pa., to that point. Cost over $150,000 with steel tanks and other equipment.

Central School District, Moravia, N. Y., plans manual training department in new multi-story central school, for which bids will be asked soon on general contract. Cost about $760,000. Financing is being arranged. C. W. Clark, 27 North Main Street, Cortland, N. Y., is architect.

Erie Railroad Co., Midland Building, Cleveland, has let general contract to F. W. Smith, 1836 Euclid Avenue, for new engine house and shop at Hornell, N. Y. Cost over $45,000 with equipment. G. S. Fanning, first noted address, is chief engineer.

WASHINGTON DIST.

Purchasing and Contracting Officer, Holabird Quartermaster Depot, Baltimore, asks bids until Dec. 10 for motor maintenance equipment, including bench grinders, machinist vises, oil measuring cans, bucket pumps, tinner's shears, seven-ton capacity jacks, blacksmith's sledges, oxy-acetylene torches, hand saws, battery charger, welder's goggles, etc. (Circular 398-45.)

A. & X. Steel Products, 1200 Bush Street, Baltimore, manufacturer of steel specialties, has plans for one-story addition, 27 x 65 ft. Cost close to $40,000 with equipment.

Phillips Packing Co., Cambridge, Md., food canner and packer, has let general contract to Charles Brohawn & Brother, Cambridge, for two-story plant at Easton, Md., to replace factory recently destroyed by fire. Cost about $50,000 with equipment.

Bureau of Yards and Docks, Navy Department, Washington, asks bids until Dec. 8 for three motor-operated winches for high-power radio station at Naval Academy, Annapolis, Md. (Specifications 8349).

Board of District Commissioners, District Building, Washington, will take bids at once on revised plans for new three-story Dennison vocational school at 1300 Allison Street, N.W. Cost about $320,000 with equipment. Nathan C. Wyeth, address noted, is municipal architect.

City Auto Spring Works, Inc., Park Avenue and Preston Street, Baltimore, has let general contract to L. Schoenlein & Son, 2208 Boyer Street, for rebuilding part of two-story plant recently destroyed by fire. Cost close to $40,000 with equipment.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Dec. 7 for dies, taps, die stocks, threading sets and tap wrenches (Schedule 2141), countersinks and reamers (Schedule 2150), files (Schedule 2144), for Eastern and Western Navy Yards; for 85 gasoline fire pots (Schedule 2143) for Eastern yards and San Diego, Cal., Naval Air Station.

NEW ENGLAND

Merrimac Chemical Co., Chemical Lane, Everett, Mass., has let general contract to W. M. Bailey Co., 88 Broad Street, Boston, for one-story machine shop, 50 x 100 ft. Cost about $40,000 with equipment.

John Kern & Son, 901 Washington Avenue, Portland, Me., meat packers, have let general contract to John H. Simmonds Co., 216 Federal Street, for two-story and basement plant, 70 x 80 ft. Cost close to $50,000 with equipment.

Cremo Brewing Co., Belden Street, New Britain, Conn., will take bids at once for one-story mechanical-bottling plant, comprising first unit of expansion program to include four-story brew house, one-story additions to woodworking and other shops, addition to motor truck garage and service building, and other structures. Bids for last noted units will be asked soon. Entire project pill cost over $100,000 with equipment. Edward F. Kawiak is engineer.

Board of Trustees, Northeastern University, 316 Huntington Avenue, Boston, has begun superstructure for four-story and basement engineering building, for which general contract recently was let to Sawyer Construction Co., 31 St. James Avenue. Cost about $500,000 with equipment. Coolidge, Shepley, Bulfinch & Abbott, 1 Court Street, are architects.

General Shaver Corp., Bridgeport, Conn., manufacturer of electric-operated razors, has leased about 20,000 sq. ft. in local industrial building for expansion. Company is a subsidiary of Remington-Rand, Inc., 315 Fourth Avenue, New York.

SOUTH CENTRAL

Armstrong Rubber Co., Inc., West Haven, Conn., manufacturer of automobile tires and other rubber products, has negotiated with City Council, Natchez, Miss., for erection of industrial buildings by municipality to be occupied under long-term lease. Fund of $300,000 has been voted by city for purchase of site and erection of several one-story units. Work is scheduled to begin soon.

Bernheim Distilling Co., Seventeenth and Breckenridge Streets, Louisville, has superstructure under way on three-story and basement addition, 82 x 260 ft., for which general contract recently was let to Frank Messer & Sons Co., Inc., 2515 Burnet Avenue, Cincinnati, for storage and distribution, and mechanical-bottling division. Cost over $150,000 with equipment. Carl J. Kiefer & Associates, Inc., Schmidt Building, Cincinnati, is engineer.

Sewerage and Water Board, New Orleans, will take bids soon for new municipal pumping station for waterworks at Prentiss and London Avenues. Cost about $250,000 with motor-driven pumping machinery and auxiliary equipment.

SOUTHWEST

Kansas City Industrial Land Co., Fairfax and Rickel Roads, Kansas City, Kan., has let general contract to B'iss-Duncan Construction Co., 114 West Tenth Street, Kansas City, Mo., for one-story, L-shaped addition, 200 x 250 ft., to factory branch, storage and distributing plant of Chrysler Corp., Fairfax district, Kansas City, Kan., to be occupied by last noted company under long-term lease. Cost about $200,000 with equipment. Charles E. Keyser, 609 Minnesota Avenue, Kansas City, Kan., is architect. Main offices of Chrysler Corp. are at Detroit.

Board of Education, Ponca City, Okla., plans manual training department in new two-story junior high school, for which bids have been asked on general contract. Cost about $400,000. Winkler & Reid, Oklahoma Savings & Loan Building, Oklahoma City, Okla., are architects.

Federal Engineering & Construction Co., 1822 Main Street, Kansas City, Mo., has

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plans for one-story equipment storage and distributing building, 60 x 180 ft., at 4817 Oleathea Avenue, St. Louis, and will carry out erection by day labor. Cost close to $45,000 with equipment. Joseph H. Shaughnessy, Reliance Building, Kansas City, Mo., is architect.

City Council, Blackwell, Okla., has arranged bond issue of $300,000 for extensions and improvements in municipal electric power plant, including new 4000-kw. turbo-generator unit, boilers and accessory equipment. Black & Veatch, 4706 Broadway, Kansas City, Mo., are consulting engineers.

Amsco Refining Co., West Broadway, Corpus Christi, Tex., has plans for extensions and improvements in oil refinery, to increase capacity from 4000 to 10,000 bbl. of crude oil per day. Steel tank storage and distributing division will be enlarged. Cost about $500,000 with equipment.

Cosden Petroleum Corp., Electric Building, Fort Worth, Tex., plans expansion and improvements in main oil refinery at Big Spring, Tex., to double present capacity of 7500 bbl. of crude oil daily. Cost close to $600,000 with machinery.

SOUTH ATLANTIC

Firestone Tire & Rubber Co., Akron, Ohio, has asked bids on general contract for one-story factory branch, storage and service plant, 37 x 224 ft., with extension, 70 x 76 ft., at Atlanta, Ga. Cost over $85,000 with equipment. Atlanta offices are at 658 Whitehall Street, S.W.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Dec. 10 for spare parts for airplanes for Naval Air Station, Pensacola, Fla. (Schedule 900-1241).

Port Utilities Commission, Charleston, S. C., plans two dock extensions on waterfront at Columbus and Cooper Streets, respectively, including two storage and equipment buildings on each dock, one-story, 50 x 150 ft., and 130 x 500 ft., with unloading, conveying, hoisting and other mechanical-handling equipment. Fund of $500,000 has been arranged for work.

WESTERN PA. DIST.

Republic Oil Co., Benedum Trees Building, Pittsburgh, has organized Duval Gasoline Co., a subsidiary to build a new gasoline refinery at Benevides, Tex., in Duval oil field area, with power house, pumping station and steel tank storage division. Cost over $250,000 with equipment. New company will maintain headquarters at Duval, Tex. Standard Oil Co. of Kansas, Kansas City, Kan., is interested in project.

Mesta Machine Co., Homestead, Pa., rolling mill machinery and other heavy equipment, has let general contract to H. Meinecke Co., 224 Catalpa Street, Mount Lebanon, Pa., for one-story addition, 95 x 200 ft., primarily for storage and distribution. Cost about $85,000 with equipment.

Pittsburgh Table Co., Carnegie, Pa., recently organized to manufacture steel-enameled table tops and kindred equipment, has taken over a local building and will begin production at once.

OHIO AND INDIANA

Osborn Mfg. Co., 5401 Hamilton Avenue, Cleveland, manufacturer of foundry molding equipment and kindred products, has let general contract to Austin Co. for two one-story additions, primarily for storage and distribution. Cost close to $50,000 with equipment.

Canton Stamping & Enameling Co., 819 Carnahan Avenue, N.E., Canton, Ohio, manufacturer enameled iron kitchenware, etc., will take bids soon on general contract for two-story addition. Cost about $50,000 with equipment.

Duriron Co., Inc., Findlay Street, Dayton, Ohio, manufacturer of alloy castings, has asked bids on general contract for one-story foundry addition, 80 x 80 ft. Cost close to $40,000 with equipment. Geyer & Neuffer, Ludlow Arcade Building, are architects.

City Council, City Hall, Columbus, Ohio, plans new municipal electric generating station, with installation of two or three gas engine-driven generator units and auxiliary equipment. Cost about $225,000 with equipment. Paul Metzel, City Hall, is city engineer.

Beckett Paper Co., Hamilton, Ohio, manufacturer of bond and writing papers, etc., has let general contract to F. K. Vaughn, Hamilton, for two-story mill addition. Cost about $50,000 with equipment. Mueller & Hair, Hamilton Bank Building, are architects.

Binney Castings Co., 401 Phillips Avenue, Toledo, Ohio, manufacturer of metal alloy castings, has let general contract to Austin Co., Cleveland, for one-story foundry addition. Cost close to $40,000 with equipment.

Contracting Officer, Materiel Division, Army Air Corps, Wright Field, Dayton, Ohio, asks bids until Dec. 9 for 58 36-in. wheel assemblies, 40 24-in. wheel assemblies, and 116 hydraulic brake assemblies (Circular 414); until Dec. 6, one gasoline engine-driven electric power plant (Circular 428.)

Board of Public Works, Bluffton, Ind., asks bids until Dec. 7 for extensions and improvements in municipal electric power plant, including new 400-hp. boiler unit and accessories, superheater, soot blower and auxiliary equipment. B. H. Freeland is superintendent of municipal power plant and engineer.

MICHIGAN DISTRICT

Schmidt Brewing Co., 1995 Wilkins Street, Detroit, has asked bids on general contract for two-story mechanical-bottling plant. Cost over $65,000 with machinery. Harley & Ellington, Inc., Stroh Building, is architect and engineer.

Castile Mining Co., Ramsay, Mich., has let general contract to P. J. Nickel, Ironwood, Mich., for one-story and basement general service mill unit, 50 x 150 ft., at local Eureka iron mines. Cost about $45,000 with equipment.

Michigan Alkali Co., Wyandotte, Mich., has plans for large one-story addition for production of chlorine and caustic soda under a special electric-operated process, for which American rights have been secured from Imperial Chemical Industries, Ltd., London, England. Expansion will be carried out at power plant with installation of new turbo-generator unit, boilers and auxiliary equipment for service at new mill. Erection will be by day labor. Cost close to $1,000,000 with machinery.

MIDDLE WEST

Northwestern Beverage Co., 3691 West Grand Avenue, Chicago, has let general contract to M. Dubin, 1512 South Harding Avenue, for one-story addition, 27 x 144 ft., for storage and distribution. Cost about $40,000 with equipment. M. B. Levinson, 2019 North Kedzie Avenue, is architect.

Chicago & Eastern Illinois Railroad Co., 332 South Michigan Avenue, Chicago, plans rebuilding one-story coach shop at general construction and repair shops, Danville, Ill., recently destroyed by fire. Loss close to $300,000 with equipment.

Apex Smelting Co., 2556 West Fillmore Street, Chicago, producer of aluminum, zinc and other metal alloys, has purchased three-story building at 2355 West Taylor Street, and will improve for expansion.

State Board of Control, State Office Building, St. Paul, Minn., asks bids until Dec. 7 for deep-well pumping machinery and auxiliary equipment for institution at Moose Lake, Minn. Rose & Harris, Essex Building, Minneapolis, Minn., are consulting engineers.

Bureau of Reclamation, Denver, asks bids until Dec. 13 for two 72-in. ring-follower gates and two bell-mouth castings for outlet works at Seminoe Dam, Kendrick Project, Wyo. (Specifications 761.)

Wood Conversion Co., Cloquet, Minn., plans extensions and improvements in power house, including new boiler units and auxiliary equipment. Estimates of cost are being made by Ralph D. Thomas & Associates, Inc., 1200 Second Avenue South, Minneapolis, consulting engineer.

Livingston & Mount Olive Coal Co., Livingston, Ill., plans rebuilding tipple at local coal-mining properties recently destroyed by fire. Loss close to $40,000 with elevating, loading and other equipment.

Standard Oil Co., Fidelity Building, Duluth, Minn., plans expansion and improvements in local bulk oil storage and distributing plant on Rene Street, near Fortieth Avenue West, including new steel storage tanks and other equipment. Cost close to $50,000. Company is closing negotiations with city for vacating of street to provide site for project.

Manitowoc Ship Building Co., Manitowoc, Wis., has taken a contract from Socony-Vacuum Oil Co. to build a 300-ft. oil tanker with capacity of 25,000 bbl. for Great Lakes service, at an approximate cost of $600,000.

PACIFIC COAST

Armstrong Cork Co., Lancaster, Pa., has asked bids on general contract for branch plant near South Gate Limits, Los Angeles, comprising one-story manufacturing unit, 85 x 240 ft., power house and office and operating building. Cost about $300,000 with machinery. Company has 28-acre tract at location noted and will build additional units later, following completion of present structures. Hugh M. Clarke is vice-president in charge. Henry Boettcher is company architect.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Dec. 7 for one motor-driven tool-maker's precision lathe including attachments (Schedule 2162), eight pump pressure regulator governors and spare parts (Schedule 2160) for San Pedro, Los Angeles, naval station; steel tubing for fuel oil heaters (Schedule 2172) for Mare Island and Puget Sound yards; six pneumatic drills (Schedule 2153) for Puget Sound yard.

Pacific Paint & Varnish Co., Fourth and Cedar Streets, Berkeley, Cal., has asked bids on general contract for one-story addition, 50 x 100 ft. Cost close to $40,000 with equipment. W. H. Ellison, Pacific Building, San Francisco, is consulting engineer.

Western Bottling Co., 804 East Sprague Street, Spokane, Wash., has engaged Arthur W. Cowley, Wellington Apartments, architect, to prepare plans for one-story and basement addition to mechanical-bottling plant, 100 x 150 ft. Cost close to $60,000 with equipment.

Bureau of Reclamation, Denver, asks bids until Dec. 6 for eight motor-driven radial gate hoists and two 3000-lb. radial gate hoists for power drops Nos. 2, 3, 4 and 5, and for New Briar turnout, All-American Canal, Boulder Canyon project (Specifications 966-D); until Dec. 7, for 11 16,000-lb. and two 3500-lb. radial gate hoists for Pillow Knob check and wasteway; two 12,000-lb. and four 3500-lb. radial gate hoists for New River crossing; two 1600-lb., one 2000-lb., one 1200-lb. and two 12,000-lb. radial gate hoists for New Wisteria, Woodbine, Wormwood and West Side main canal and turnouts, All-American Canal system (Specifications 997-D).

Cinecolor, Inc., plans erection of plant at 719 North San Vincente Boulevard, Los Angeles with about 42,000 sq. ft. floor space. Cost $400,000.

University of Washington, Seattle, plans a $220,000 addition to heating and power plant early next year. Plans are under way by Charles C. May, superintendent of buildings and grounds, Education Hall.

Pacific Gas & Electric Co., San Francisco, has plans for steam generating plant at Tidewater Associated Oil Co. refinery, Avon, Cal., to cost about $5,000,000.

FOREIGN

British Eagle Oil Co., Ltd., Tampico, Mexico, has secured additional concessions from Mexican Government for operations in Poza Rica oil field, near Tampico. Company plans installation of equipment for drilling and operating 30 to 40 wells, including pumping machinery, oil well casings, steel tank facilities, etc. Concession provides for construction of two new oil refineries by company, to cost about $7,000,000 with machinery, of which company will defray $3,000,000 and Government $4,000,000 on profit-sharing basis. Ten steel tankers will be built at cost of about $4,800,000. Main offices of company are at London, England; it is a subsidiary of Royal-Dutch-Shell Co., London.

Hammond Iron Foundry, Ltd., Hawlbowline, Ireland, plans expansion, comprising several one-story units for enlargement in foundry and finishing divisions, and for steel products manufacture. Cost over $500,000 with equipment.

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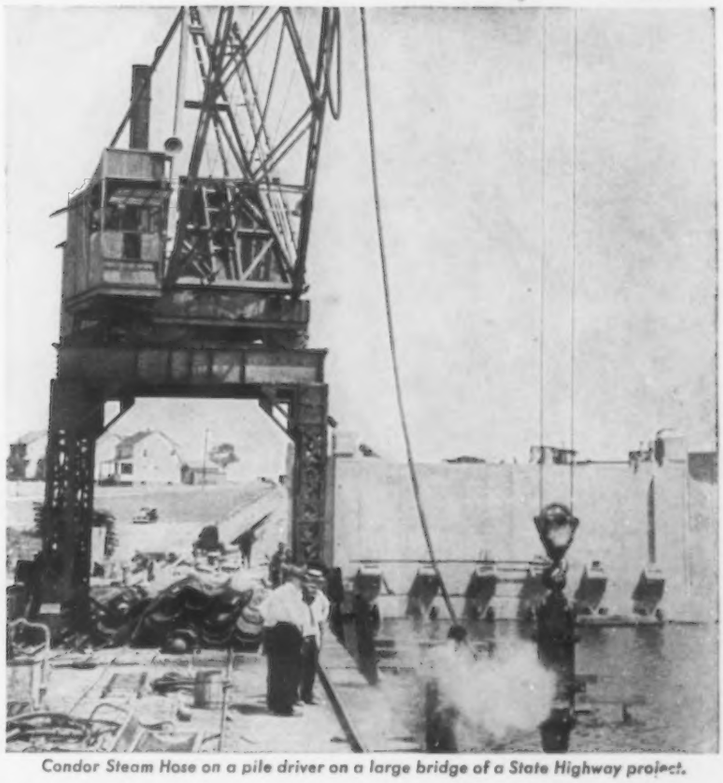

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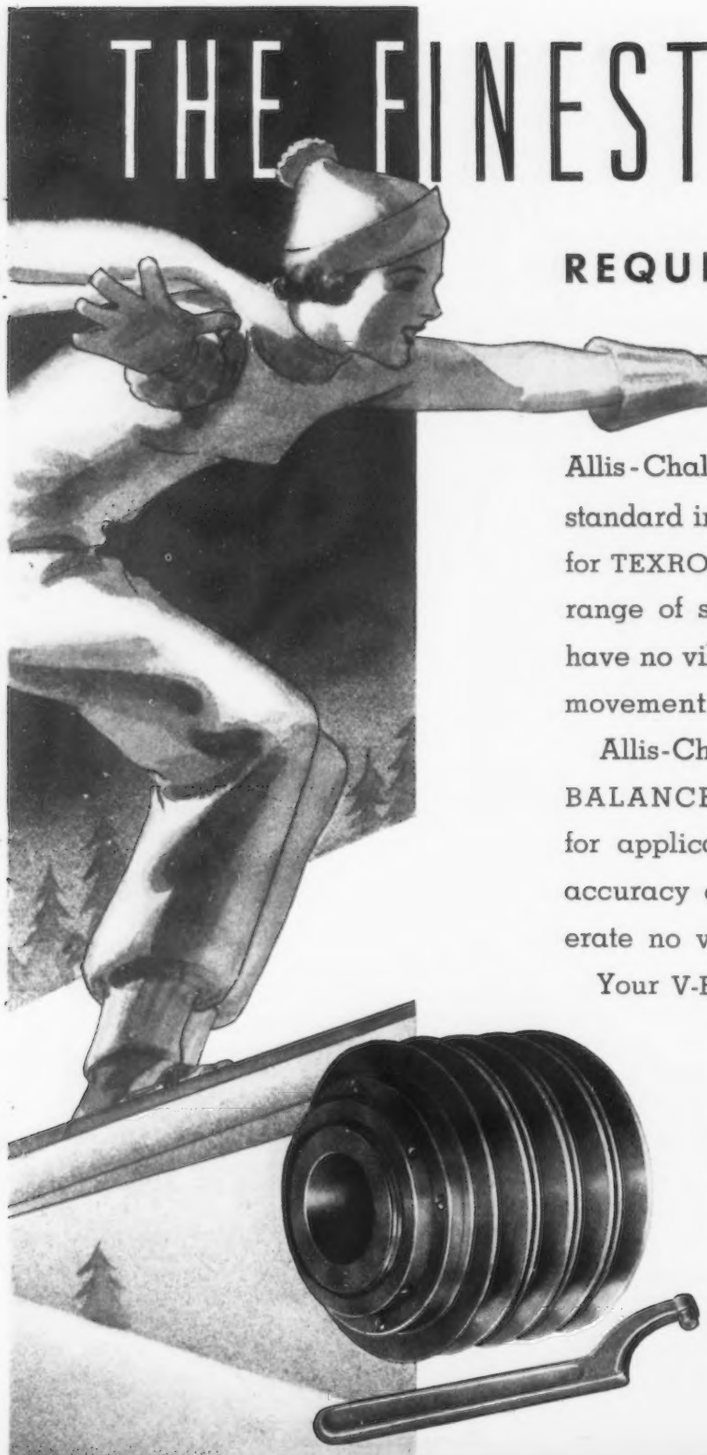

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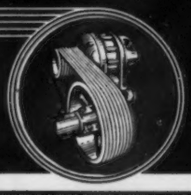

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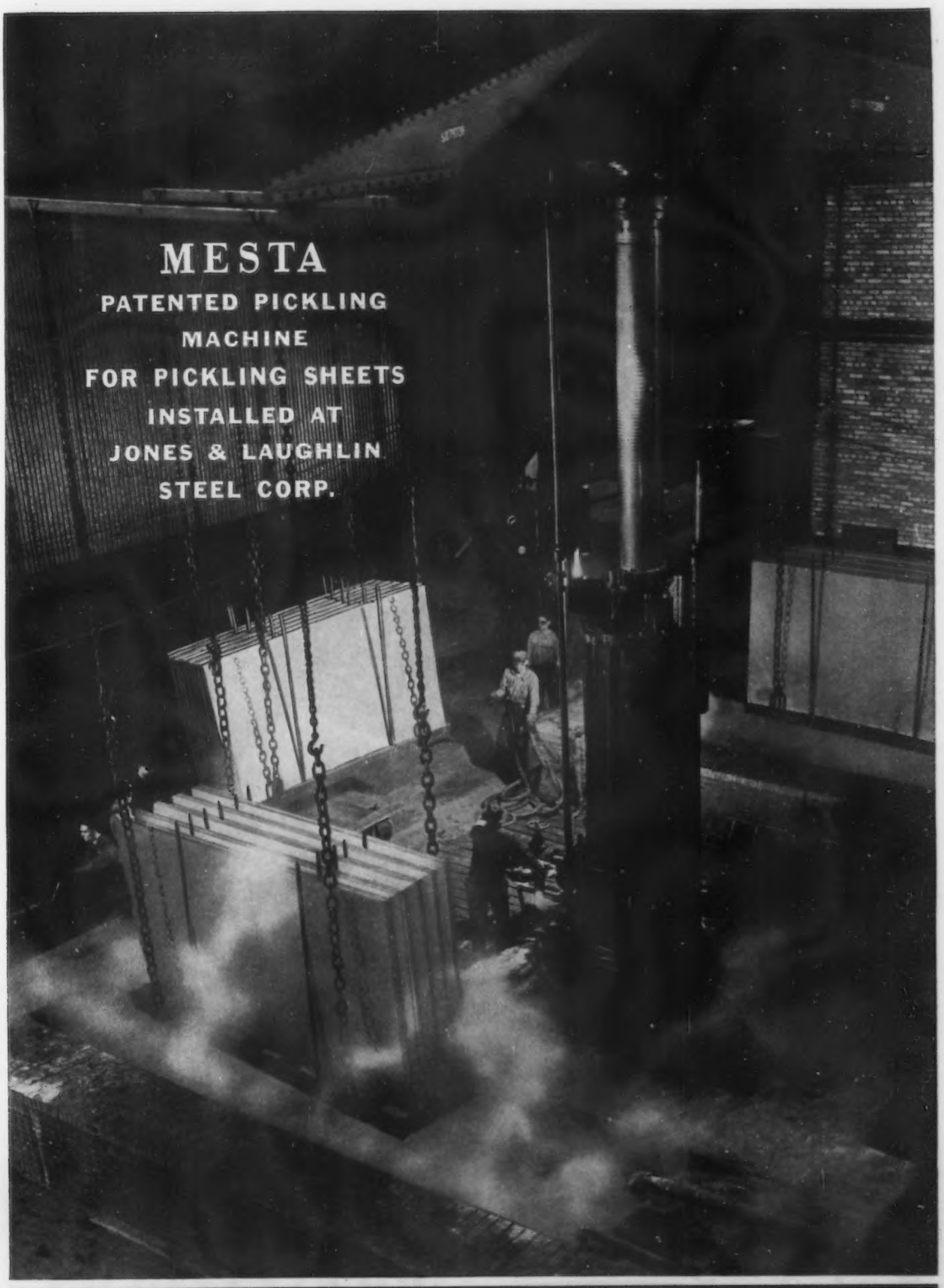

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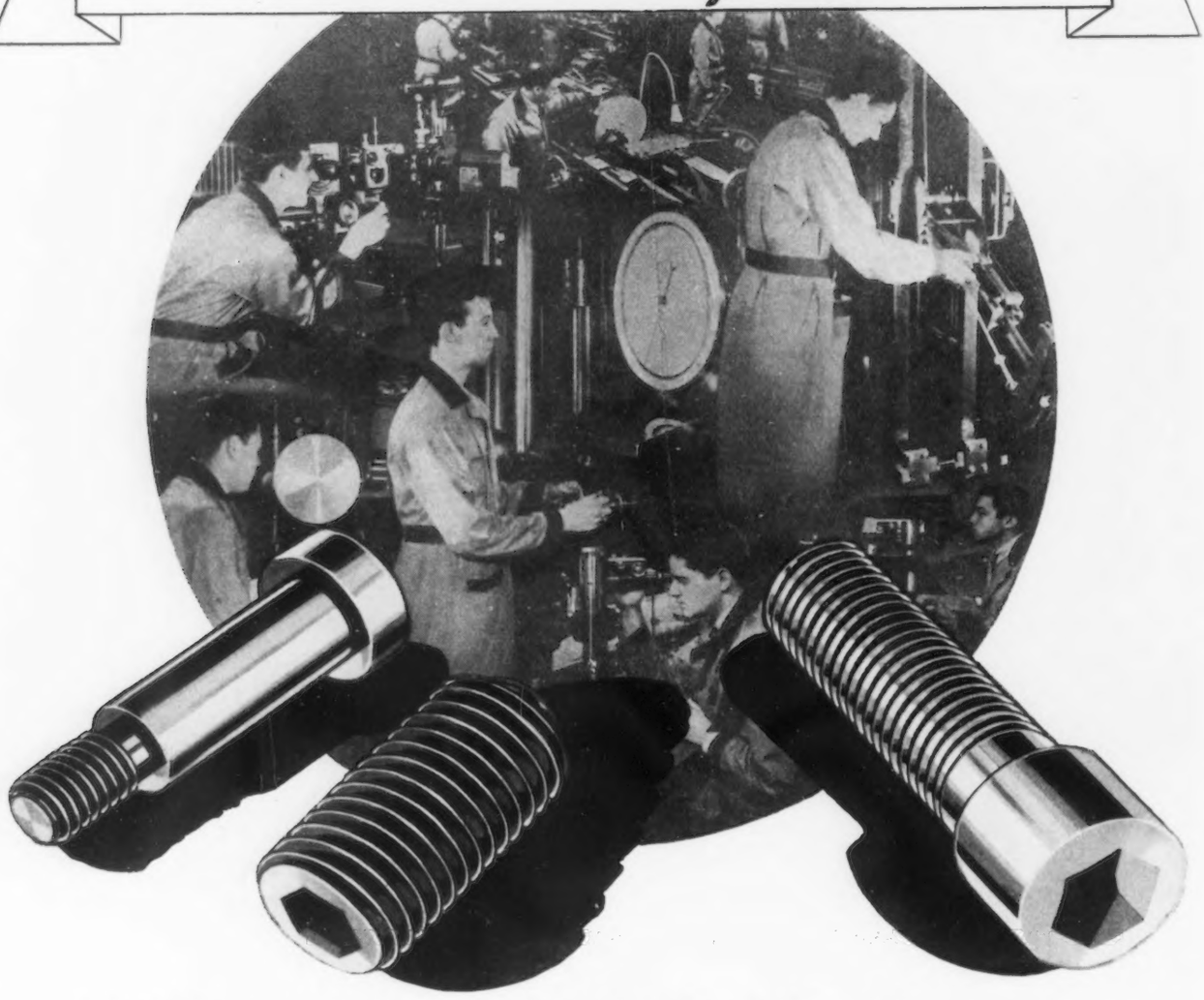

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- ☑ *Engineered* **STRENGTH**
- ☑ *Controlled* **UNIFORMITY**
- ☑ *Micrometer* **ACCURACY**
- ☑ *Faultless* **DESIGN**

PARKER-KALON *Cold-forged* SOCKET SCREWS

About Tests

Frankly speaking, the above four tests have been selected. They were selected because they were near the average of all the tests on record and because they were typical. All were made on production jobs.

You know and we know that one test does not mean much. *On more than ten thousand tests Molybdenum-Tungsten high speed tools averaged twenty percent better than similar tools made of 18-4-1 steel.* Such an average obtained by careful statistical methods is dependable.

MO-MAX*

TRADE MARK REG. U.S. PAT. OFF.

Molybdenum-Tungsten High Speed Steel

has been in general commercial use for more than four years. Many tool manufacturers now use it for their regular high speed product. Many consumers are using it for the high speed tools made in their own tool rooms.

It requires 8% less weight of steel to make a tool . . . It is easy to weld . . . It is easy to forge . . . It is easy to machine . . . It is easy to grind . . . Its tools are harder . . . Its tools are tougher . . . Its tools have superior cutting quality.

Leading steel companies in North America and Europe are now licensed to make MO-MAX. A booklet giving the essential data may be obtained by addressing The Cleveland Twist Drill Company, Cleveland, Ohio.

SHIFT TO MO-MAX FOR QUALITY AND QUANTITY PRODUCTION

*MO-MAX is a proprietary name owned and controlled by The Cleveland Twist Drill Company and its only licensed use by others is on steel made and sold by licensees under U. S. Patent Nos. 1,937,334; 1,998,953; 1,998,954; 1,998,955; 1,998,956; 1,998,957; and Canadian Patent Nos. 346,506; 364,032 and 364,033.

7785

"MINUTE MEN"
of Industry

In the metal-working industries, materials and design are interdependent. The characteristics of the metal used are second only to function in shaping the design. The dominant consideration may be corrosion-resistance, hardness, softness, strength, ductility, thermal and electrical conductivity, weldability, capacity for taking a required finish, cost—or a certain combination of these qualities.

In many plants and industries, Revere Technical Advisory Service men are working shoulder to shoulder with executives and engineers in solving such problems by selecting a suitable type and form of copper or one of the many copper-base alloys. These are picked men, with broad backgrounds in metal-working methods, plus highly specialized knowledge of copper and copper-base alloy characteristics and applications. They are supported in this work by the full cooperation of the Revere research laboratories and Revere mills.

One of these Revere Technical Advisory Service men can be assigned to help you solve problems of this kind in your own work, in your own plant—at no expense to you. Acceptance of this offer will place you under no obligation whatever. Please address your inquiry to our Executive Offices, 230 Park Avenue, New York City.

Revere

FOUNDED BY PAUL REVERE 1801

Copper *and* Brass

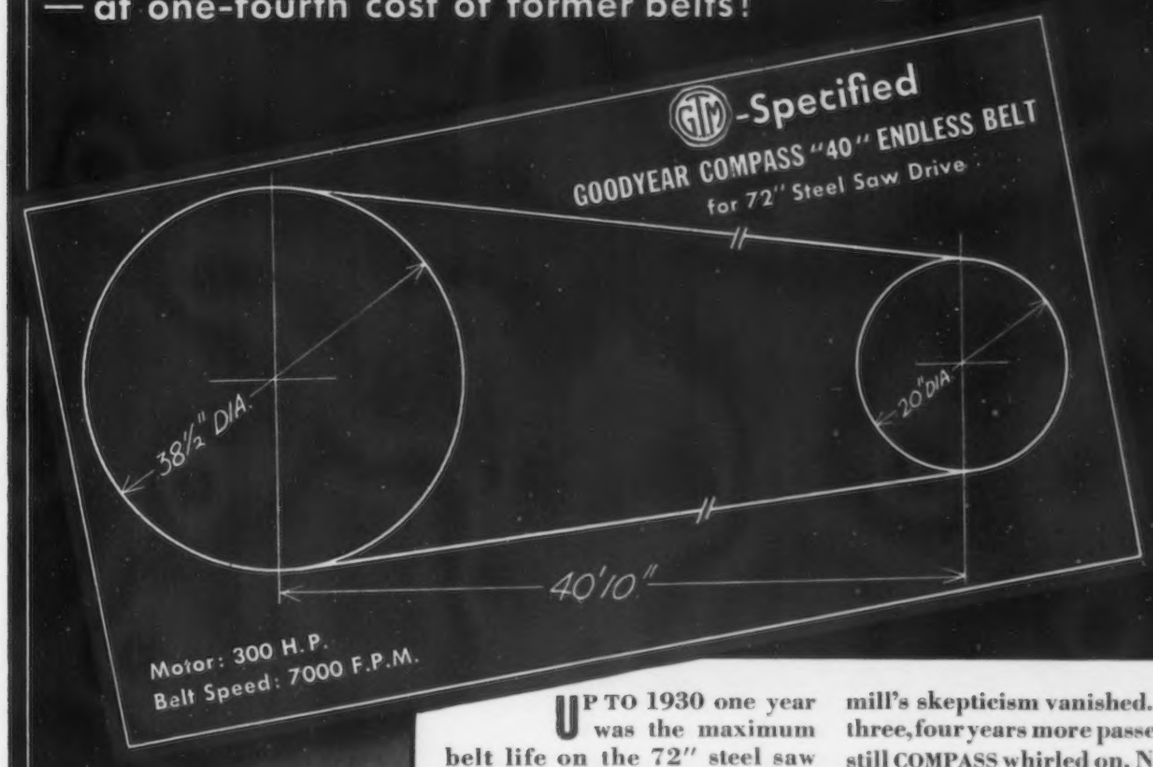
INCORPORATED

EXECUTIVE OFFICES: 230 PARK AVE., N. Y. C.

MILLS: BALTIMORE, MD. · TAUNTON, MASS. · ROME, N. Y. · DETROIT, MICH. NEW BEDFORD, MASS. · CHICAGO, ILL. · SALES OFFICES IN PRINCIPAL CITIES

RUNS STEEL SAW DRIVE 6 YEARS

— at one-fourth cost of former belts!



HERE'S THE REASON WHY

—note the heavy rope-cord carcass beneath the cut-away section of the COMPASS cover. This high-tensile rope is spiralled continuously without a splice—the weak joint in other belts. Truly endless, COMPASS is the most nearly stretchless belt ever built.

UP TO 1930 one year was the maximum belt life on the 72" steel saw drive in one of the nation's largest steel mills. They were using the costliest grade of "triple" belting, yet frequent repairs were necessary to correct slip, stretch, ply separation and splice failures caused by high speed and extremely variable overload.

Then the G. T. M. — Goodyear Technical Man — recommended a Goodyear COMPASS Belt made truly endless. The mill was skeptical of rubber belting's ability to handle this shock-load drive but they were willing to try anything once and on October 5, 1930 a Goodyear COMPASS "40" Belt was applied.

Compass makes good— and how!

One year went by without a single shutdown for repairs and the mill's skepticism vanished. Two, three, four years more passed and still COMPASS whirled on. Not until November 5, 1936—six years and one month to the day after installation — did the COMPASS fail and have to be removed.

How much did the COMPASS cost? Just 25% as much as the combined first cost and maintenance charges on the "triple" belting previously used — and the COMPASS ran *six times longer!* Today every steel saw and endless drive in this big mill are being COMPASS-driven with the same signal economy.

Economy! Long life! Trouble-free performance! These are the three big reasons why it pays to consult the G.T.M. on all your belting and hose requirements. To bring the G.T.M. to your mill, write Goodyear, Akron, Ohio, or Los Angeles, California—or the Nearest Goodyear Mechanical Rubber Goods Distributor.

BELTS
MOLDED GOODS
HOSE
PACKING
Made by the makers of Goodyear Tires

THE GREATEST NAME IN RUBBER

GOODYEAR

SEYMOUR
PHOSPHOR BRONZE
WIDELY USED IN THE HEAVIER GAUGES

PAST advertisements have placed much emphasis on the eminent suitability of Seymour Phosphor Bronze for fabrication into small springs, contacts, clips, cams, slides, nuts, bolts, etc., because a very important tonnage goes into these smaller fittings and parts.

However — the extreme corrosion resistance, toughness, and ability to function in face of almost endless fatigue cycles, make Seymour Phosphor Bronze sheet, wire and rod just as necessary in products where more "heroic" service is demanded.

Pictured here are a few of the heavy duty springs fabricated by Seymour customers for a wide variety of strenuous uses.

Railroad equipment claims many heavy duty Phosphor Bronze springs, for such places as in the pantograph shoes of electric locomotives, in numerous valve actions, and in train control systems.

The U. S. Government finds extensive use for these springs in boat and submarine design.

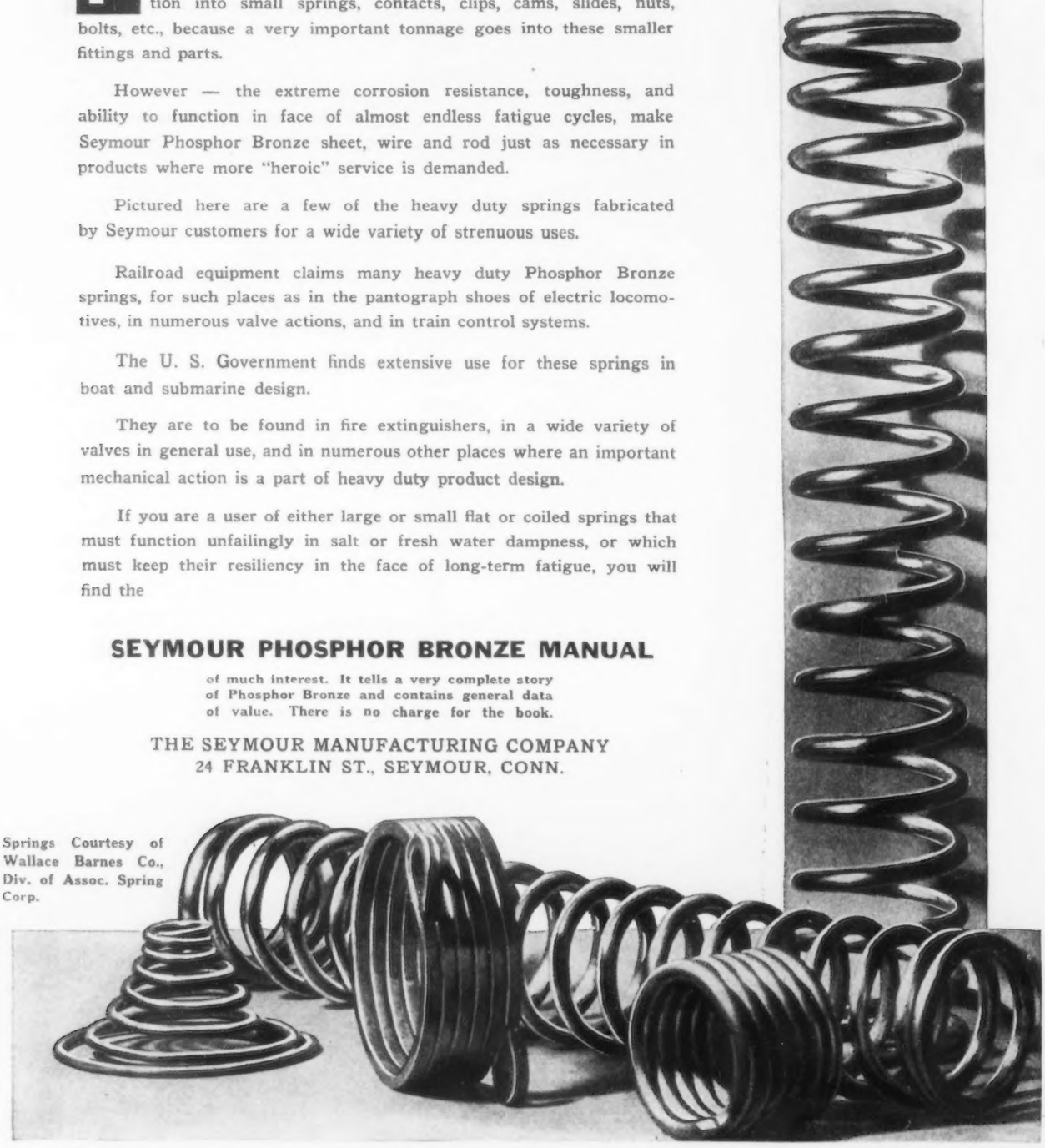
They are to be found in fire extinguishers, in a wide variety of valves in general use, and in numerous other places where an important mechanical action is a part of heavy duty product design.

If you are a user of either large or small flat or coiled springs that must function unfailingly in salt or fresh water dampness, or which must keep their resiliency in the face of long-term fatigue, you will find the

SEYMOUR PHOSPHOR BRONZE MANUAL

of much interest. It tells a very complete story of Phosphor Bronze and contains general data of value. There is no charge for the book.

THE SEYMOUR MANUFACTURING COMPANY
24 FRANKLIN ST., SEYMOUR, CONN.



Springs Courtesy of Wallace Barnes Co., Div. of Assoc. Spring Corp.

Butler Mfg. Co., Kansas City, Mo., weld faster and produce cleaner welds with their new fleet of "Shield-Arc SAE" welders.

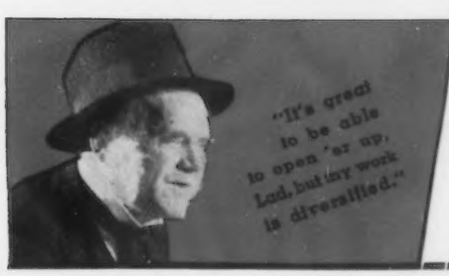
You can use larger electrodes and WELD 15% to 20% FASTER with the "*Shield-Arc* SAE"

SELF-PROTECTED AGAINST BURN-OUT, the Lincoln "*Shield-Arc* SAE" Welder can be operated at high average loads continuously without harm or danger. This means that you can use larger electrodes than with conventional welders, resulting in faster welding. Users report production increases of 15% to 20% because of this built-in protection of the "*Shield-Arc* SAE." Ask for proof.

Write for a free copy of "The New Arc Welding Technique," which gives complete details about "*SHIELD-ARC* SAE"—THE COMPLETE WELDER.

THE LINCOLN ELECTRIC COMPANY, Cleveland, Ohio

Largest Manufacturers of Arc Welding Equipment in the World



THE LINCOLN ELECTRIC COMPANY
Dept. X-448 Cleveland, Ohio

☐ Send the FREE Procedure Guide, Bul. 401.
☐ Send FREE copy of "The New Arc Welding Technique."

Name _____ Position _____

Company _____

Address _____

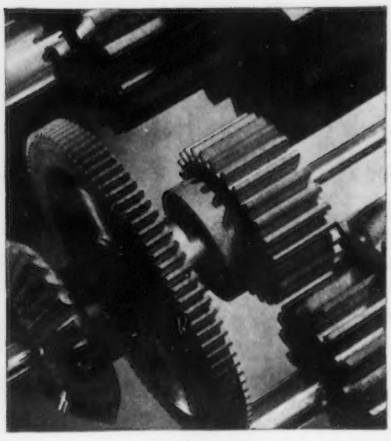
City _____ State _____

ANOTHER PLACE WHERE *Silent Gears mean Saving*

IMPORTANT economies in maintenance are obtained by employing Bakelite Laminated pinions on stripping presses and other forge-shop machines. Where metal pinions suffer from the abrasion of mill scale, Bakelite Laminated pinions not only last indefinitely, but also reduce wear on the metal gears they drive.

For many other types of machinery, Bakelite Laminated gears provide the additional benefit of silent operation. Inserted in the gear train, they eliminate metal-to-metal contact and prevent the nerve-wracking noises that tend to cut down worker-efficiency.

Advantageous applications of Bakelite Laminated silent gears extend from light, high-speed machines to heavy rolling mills. Write for booklet 2L, "Bakelite Laminated".



BAKELITE CORPORATION, 247 PARK AVENUE, NEW YORK, N.Y.

BAKELITE CORPORATION OF CANADA, LIMITED, 163 Dufferin Street, Toronto, Canada *West Coast:* Electrical Specialty Co., Inc., 316 Eleventh Street, San Francisco, Cal.

BAKELITE

REGISTERED U. S. PAT. OFF.

The registered trade marks shown above distinguish materials manufactured by Bakelite Corporation. Under the capital "B" is the numerical sign for infinity, or unlimited quantity. It symbolizes the infinite number of present and future uses of Bakelite Corporation's products.

LAMINATED GEARS · PINIONS · PULLEYS · CASTERS

SOMETHING *Can* BE DONE ABOUT YOUR POWER COSTS!

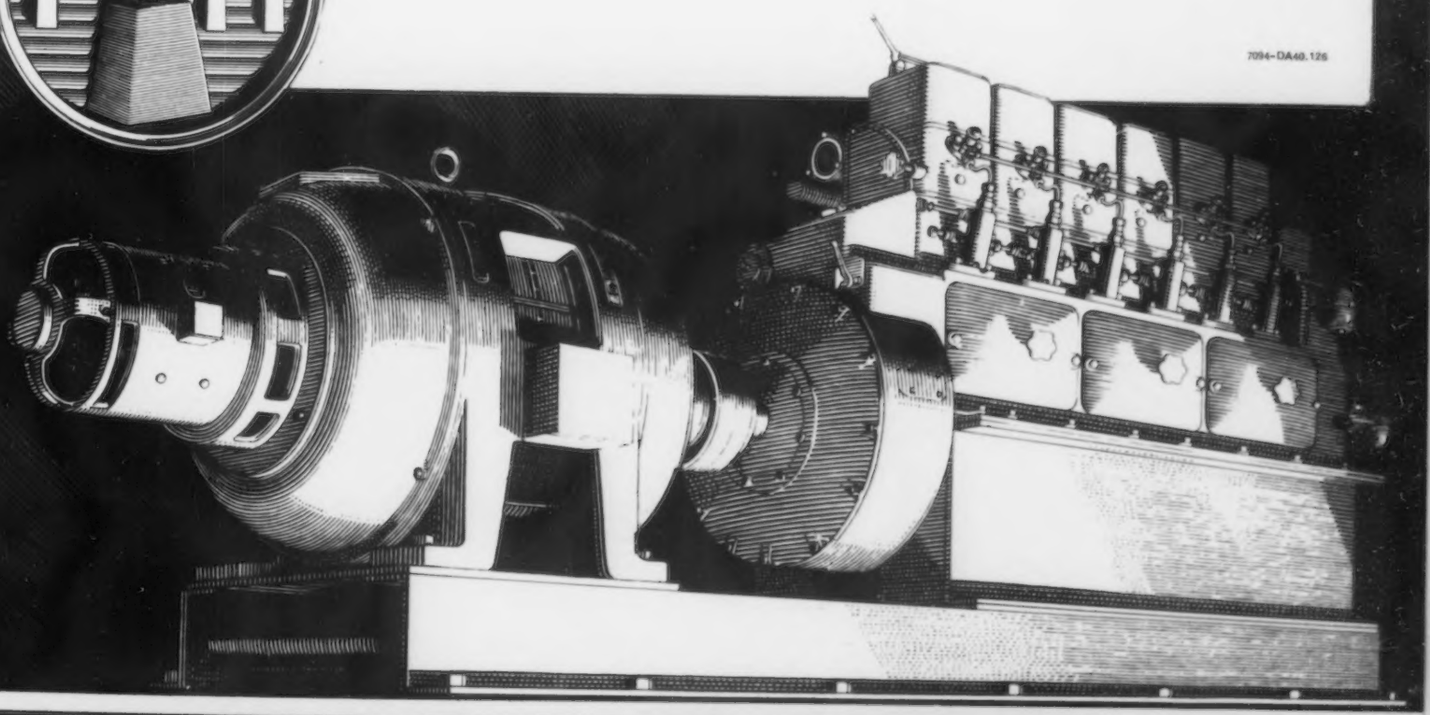
● A Diesel provides the most efficient way to make power out of fuel. Its efficiency averages double that of any other prime mover. In addition, a Diesel uses the lowest cost fuel that is available in a convenient form for automatic operation.

Almost without exception, a thorough investigation proves that a Fairbanks-Morse Diesel will cut power costs, as well as provide independence from all outside circumstances. You pay only for the power you actually use—no premium for peak-load generating capacity required to serve the community as well as yourself.

The Fairbanks-Morse Model 36 Diesel Generating Set is one of the most popular choices of plants requiring comparatively small capacity, as well as of manufacturers in need of flexible, economical power.

Do not put off your investigation of power costs any longer. Write for Bulletin 3600, Fairbanks, Morse & Co., 900 S. Wabash Avenue, Chicago, Ill. 34 branches at your service throughout the United States.

7094-DA40.12S



FAIRBANKS MORSE

Diesels

DIESEL ENGINES · PUMPS · ELECTRICAL MACHINERY · FAIRBANKS SCALES · RAILROAD EQUIPMENT · WATER SYSTEMS · REFRIGERATORS · RADIOS · WASHERS · FARM EQUIPMENT · STOKERS · AIR CONDITIONERS

FAIRBANKS-MORSE

REGARDS GUARANTEES EVEN MORE SERIOUSLY THAN YOU DO

● You can rely on Fairbanks-Morse guarantees, rely on the savings promised by Fairbanks-Morse engineers, for two reasons.

Most Fairbanks-Morse products have grown up with the industries they serve. Only one factor influences design and materials . . . conditions of service in the field. And to make doubly sure that an F-M product will be equal to any test of service, F-M inspection is ruthless.

Promises of performance are made to you by men who know industry . . . your industry in particular. Chosen for their sound judgment and ability to analyze, these F-M men know what a Fairbanks-Morse product can contribute to the efficiency and profits of your business.

On your most immediate problem of power, pumping, or weighing, call an F-M sales engineer. Fairbanks, Morse & Co., 900 S. Wabash Ave., Chicago, Ill. 34 branches at your service throughout the United States.

FAIRBANKS - MORSE

Power, Pumping, and Weighing Equipment

107 YEARS OF PRECISION MANUFACTURING

Dulls the teeth of Corrosive Acids . . .

Strips of lead with and without tellurium content after immersion in 96% sulphuric acid at 305° C. for 3 minutes. Tellurium lead weight loss, 0.97% — other lead, 5.11%.

New Low Price Now in Effect

EVIDENCE in favor of Tellurium Lead is piling up. First came laboratory tests like the one illustrated above. They indicated that Tellurium Lead held possibilities in the direction of greater acid resistance, even at the higher temperatures.

Now these laboratory results are verified by plant service covering a wide variety of applications in many industries. In the panel at right are two typical service reports.

Another important quality of Tellurium Lead is this: It possesses the property of strengthening under stress. In other words, it work-hardens. Stretching, bending, hammering and other forms of mechanical action increase the tensile strength and fracture-resistance of Tellurium Lead. In addition, Tellurium Lead affords superior resistance to fatigue failure caused by vibration.

Tellurium Lead of our manufacture is St. Joe chemical lead alloyed with a small quantity of tellurium. It gives the advantages of this time-tested chemical lead plus important new ones. Yet now, due to a price reduction, it costs only a fraction of a cent more per pound than chemical lead. Available in sheets, pipe and coils. For further facts, write to nearest branch.

NATIONAL LEAD COMPANY

New York, Baltimore, Buffalo, Chicago, Cleveland, Cincinnati, St. Louis; National-Boston Lead Co., Boston; John T. Lewis & Bros. Co., Philadelphia; National Lead & Oil Co., Pittsburgh; Georgia Lead Works, Atlanta; Gibson & Price Co., Cleveland; American Lead Corp., Indianapolis; Master Metals, Inc., Cleveland; The Canada Metal Co., Ltd., Toronto, Montreal, Winnipeg, Vancouver.

A MANUFACTURER REPORTS:

"We used your tellurium sheet lead to line an acid-cutting tank. Strong sulphuric acid is dumped into the tank and sufficient water added to bring it to the proper strength. This naturally generates considerable heat. The operation has been repeated daily for nearly three years. To date no leakage or other difficulty has been experienced. The lining is as good as the day installed. We feel that Tellurium is entirely responsible for this as we have never before had such a favorable result."

• • •

ANOTHER USER WRITES:

"I wish to say that your tellurium lead pipe has proven all you claimed. It is easy to weld and easy to flange. Also the flanges stand up a good deal better than ordinary lead as they seem to actually become stronger at the turnover point."

Tellurium Lead is now extensively used to line tanks and for pipes and coils, in plants handling sulphuric and sulphurous acids, hot chrome solutions, copper sulphite solutions, chlorine gas, hydrochloric acid fumes and hydrofluoric acid.

Tellurium Lead

"In 12 years, we have never had a battery failure with Exide-Ironclads"

"After seven years, the battery in our crane truck is still giving satisfactory service"

"With steep ramps and unpaved roads, Exide-Ironclads have given us excellent performance"

"No trouble with the battery in ten years' constant operation"

"With Exide-Ironclad Batteries, our electric industrial trucks work successfully on the steep grades in our plant"

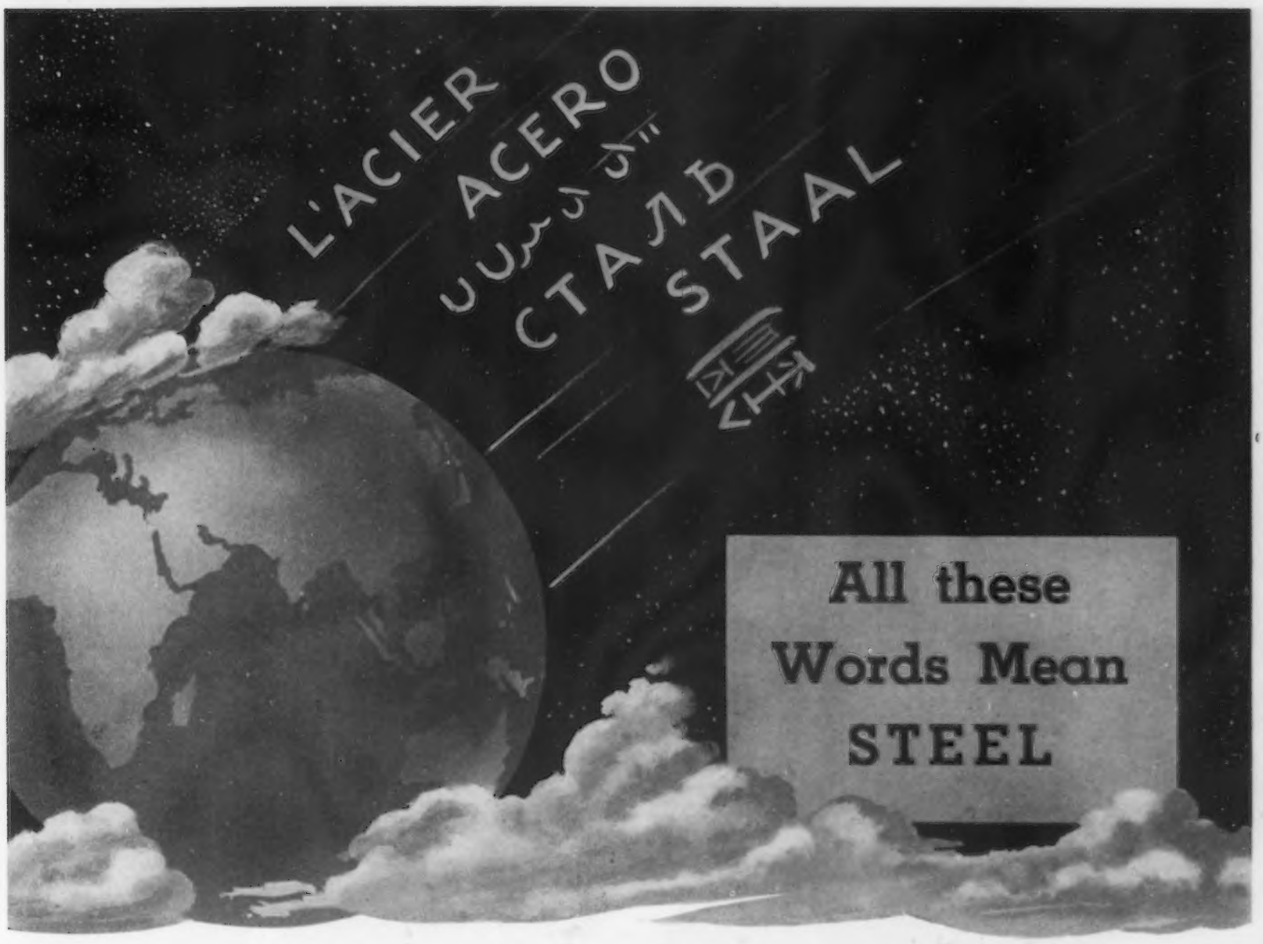
"No trouble, no repairs, with our six-year-old Exide-Ironclad Batteries"

IN the material handling service of today, in which electric industrial truck and battery alike must be packed with giant power and endurance, operators in every industry have found that the Exide-Ironclad Battery is a sure means of speeding up the work and cutting costs.

Their own records bear this out. Above, you see some of their comments. The Exide-Ironclad Battery has demonstrated, not only that it has more than ample power for heavy loads, with a sustained voltage that assures continued good speeds, but that it is trouble-free, exceedingly easy to care for, and so long lived it far outlives its guarantee in many instances. Write for free booklet, "In Selecting Any Motive Power Battery—BE SURE."

Exide
IRONCLAD
BATTERIES
With Exide MIPOR Separators
"MIPOR," Reg. U. S. Pat. Off.

THE ELECTRIC STORAGE BATTERY CO., Philadelphia
The World's Largest Manufacturers of Storage Batteries for Every Purpose
Exide Batteries of Canada, Limited, Toronto

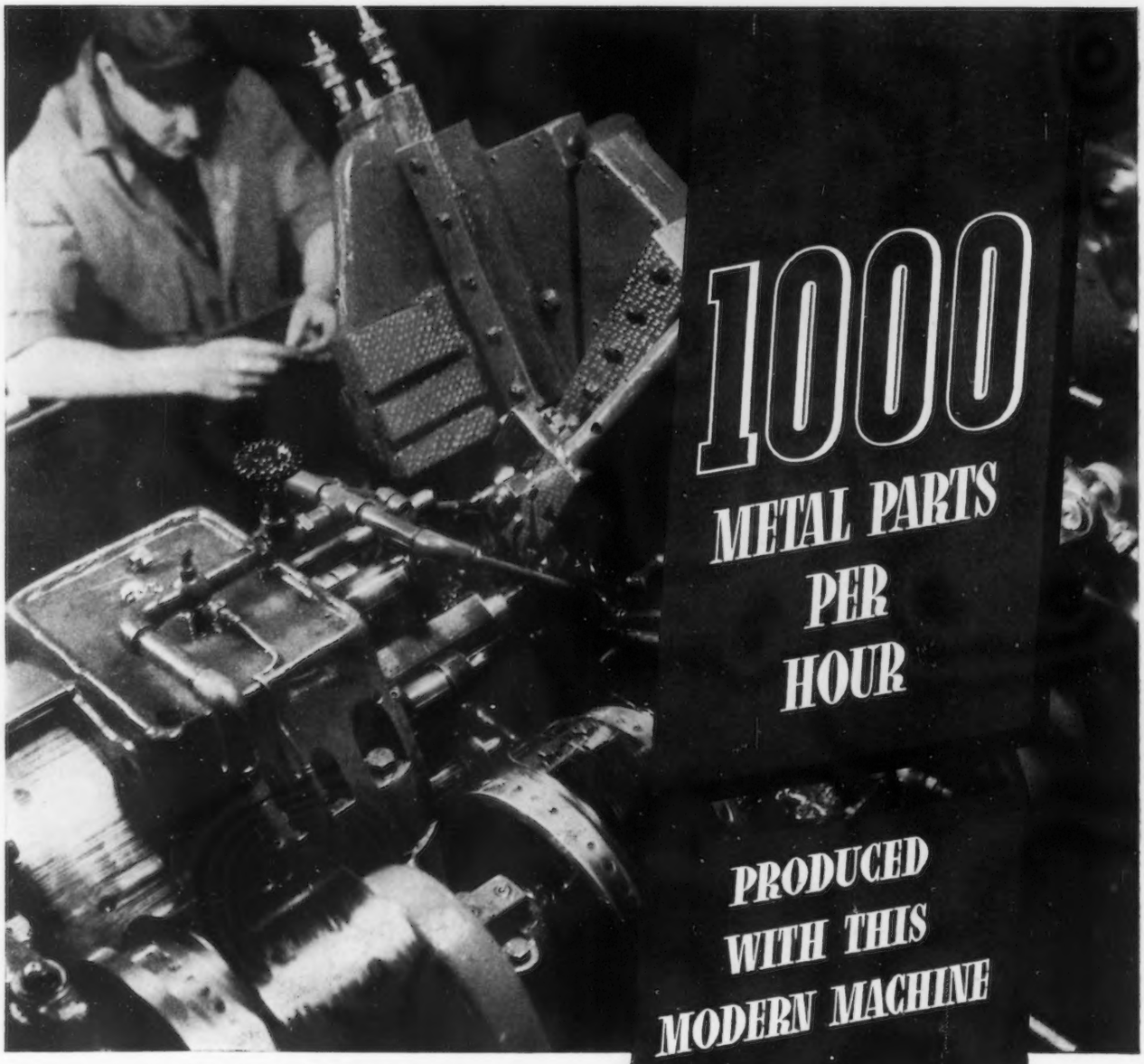


But "Harrisburg" Means QUALITY in Seamless and Drop Forged Steel Products

In the "land of the Boers", beneath the Southern Cross. . . . On the wind-swept steppes of Russia . . . In Persia, where East meets West. . . . The world around, always a strange and different word for steel! Harrisburg takes pride in the fact that today at many of these far-flung points the name Harrisburg is being used in connection with the word for Steel to designate a superior product.

Harrisburg seamless and forged steel products have followed the tide in the petroleum industry as surely as "trade follows the flag". For years these products have been a standard wherever men bore for "black gold". Today in many other industries Harrisburg's policy of making steels to suit the product is fully appreciated. Today an increasing number of specifiers realize the advantage, to them, of the unusually self-contained nature of Harrisburg's steel producing and processing facilities : : : Representatives in principal cities. General offices, Harrisburg, Penna.

ALLOY AND CARBON STEELS · DROP AND HOLLOW FORGINGS · PIPE FLANGES, COUPLINGS, BULL PLUGS · PUMP LINERS · CYLINDERS · COILS, BENDS



THIS SIX-SPINDLE AUTOMATIC MACHINE produces 1000 metal pieces for door knobs in an hour. The bar stock is cut at a surface speed of approximately 200 ft. per minute and is formed, knurled, drilled and cut off in this machine.

GULF QUALITY LUBRICANTS INSURE ACCURATE WORK...AT FULL CAPACITY

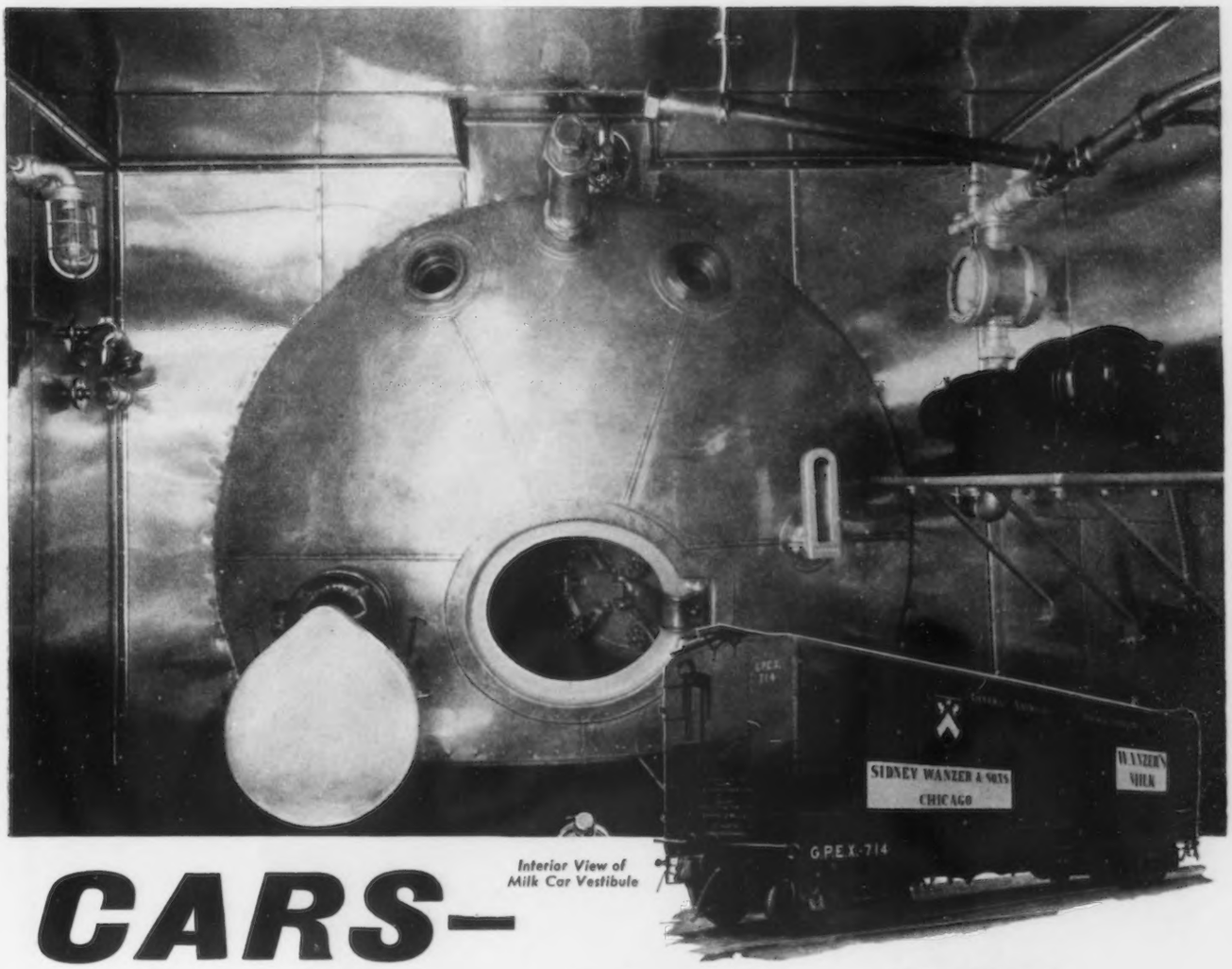
Accurate, high-speed production— that's what modern machines like this are built for!

And they'll perform at peak efficiency when lubrication is right. Finely finished parts built with close tolerances must have the protection of the highest quality oil to insure accurate work and a high rate of production.

When you bring the Gulf engineer into the "picture" in your plant you enlist the cooperative service of a man whose broad experience and knowledge of lubrication can be a real help to you in maintaining efficient production from every machine you operate. He will recommend the scientific use of the lubricants exactly suited to the requirements of your equipment. Then, periodically, he will check the performance of each machine and suggest such further improvements in lubrication practice as are needed to provide for the operating conditions encountered.

This kind of lubrication service has a real dollar and cents value to you. Talk with the Gulf engineer when he calls.

GULF OIL CORPORATION GULF INDUSTRIAL LUBRICATION **GULF REFINING COMPANY**



Interior View of Milk Car Vestibule

CARS—

that have revolutionized Transportation of DAIRY PRODUCTS!

The engineering departments of two great Corporations — General American Pfaudler Corporation, Subsidiary of the General American Transportation Corporation, and Ingersoll Steel and Disc Division of Borg-Warner Corporation — have collaborated in adopting IngAclad Stainless-Clad steel as a standard material for the lining of vestibules for tank milk cars. The gleaming polished stainless steel surfaces of the vestibules give added assurance of complete sanitation and cleanliness.

This is just one of the many applications IngAclad is finding in the Food, Chemical and other process industries. Investigate the economy and other advantages of IngAclad in manufacturing, handling, transporting and storing of products where sanitation and non-corrosion are vital. Write for illustrated folder showing wide variety of applications.

55 CARS

have already been built by General American Transportation Corporation, using . . .

INGACLAD Trade Mark Reg.

STAINLESS-CLAD STEEL

"A BORG-WARNER PRODUCT"

Pure stainless steel (18-8) on the surface in contact with the product, is inseparably welded to a layer of ordinary steel by the Ingersoll patented cast-in-the-ingot process—reducing the basic material cost as much as 50%.

Licensees of the IngAclad Process

Allegheny Steel Co., Brackenridge, Pa.
Granite City Steel Co., Granite City, Ill.
Samuel Fox, Ltd., Division United Steels, Ltd., Sheffield, England
Fried. Krupp, Essen, Germany

INGERSOLL STEEL & DISC DIVISION
BORG-WARNER CORPORATION
310 SOUTH MICHIGAN AVENUE, CHICAGO, ILLINOIS

INGACLAD GIVES STAINLESS PROTECTION AT LOWER COST

A SET SCREW THAT LOCKS ITSELF IN PLACE

Where can you use it?

Almost every industrial plant has need for set screws that can be turned tight and depended upon to stay put . . . Do you know of a need for them in your plant? We'll be glad to send you a sample "UNBRAKO" so that you can examine the knurling around the two top threads. This knurling raises sharp prongs all around the edge of the thread which dig right into the threads of the tapped hole when the "UNBRAKO" is being tightened up . . . thus it cannot possibly work loose.

Customers have already bought about 2,000,000 "UNBRAKO" SELF-LOCKING SET SCREWS. They agree that once they're tightened up vibration never loosens them.

UNBRAKO

SELF-LOCKING HOLLOW SET SCREW

STANDARD PRESSED STEEL CO.

JENKINTOWN, PENNA.

BOX 523

BRANCHES: BOSTON, DETROIT, INDIANAPOLIS

BRANCHES: CHICAGO, ST. LOUIS, SAN FRANCISCO

LOOKING AT

Bonderizing

THROUGH A STEEL WINDOW

THE constant improvement of Parker Processes is extending their sphere of usefulness.

The recent adaptation of Bonderizing to the finishing of steel windows for the first time indicates the widening scope of this paint-holding and rust-inhibiting process. With this modern process, better paint adhesion and adequate protection from rust is provided with greater speed and economy.

Automobile bodies and other parts, as well as Washing Machines, Refrigerator and Air Conditioning Equipment, Office Machines and Electrical Devices are only a few of the scores of products on which greater assurance of finish permanence is provided by Bonderizing.

The manufacturer with a paint finishing problem should investigate the new effectiveness of Bonderizing on iron, steel or zinc surfaces.

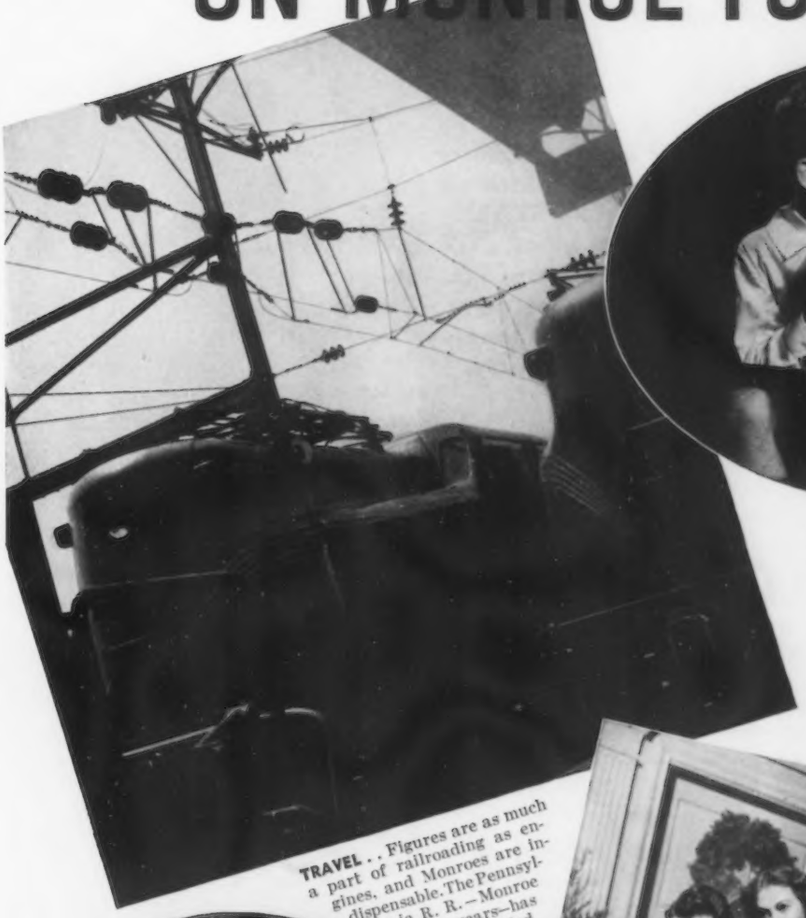
PARKER RUST-PROOF COMPANY
2186 E. Milwaukee Ave. • Detroit, Michigan

Ask for These Books

For more than 22 years, this company has devoted its entire time, talent and energy to the improvement of rust-proofing methods. New books describing the Parker Processes are available to manufacturers and technical men. Send for your copies.

PARKER *Processes* **CONQUER RUST**
BONDERIZING • PARKERIZING

BUSINESS DEPENDS ON MONROE FOR FIGURES



TRAVEL . . Figures are as much a part of railroading as engines, and Monroes are indispensable. The Pennsylvania R. R.—Monroe user for years—has recently added to its Monroe equipment.

BANANAS . . The business of importing, shipping, and distributing billions of bananas calls for endless figures. Melo-Ripe Fruit Co. buys more Monroes.

EVERYWHERE Monroes are doing the bulk of America's business figuring, because they turn out the greatest number of correct answers in the least time. Speed, simplicity, economy, and unequalled ease of operation have made Monroe the leader. Use the convenient coupon for Monroe literature.

PICTURES . . Kodaks and films mean payrolls, inventories, costs, and countless other figures, day in and day out. For years, Eastman Kodak Co. have been users of Monroes—both adding-calculators and adding-listing models.

VELVET TOUCH . . Every Monroe has the famous "Velvet Touch" keyboard, an exclusive feature that takes the strain off operators. Photo shows newest Monroe Adding-Calculator, Model MA-7, "The Fastest Producer of Business Figures."

A MONROE FOR EVERY FIGURE JOB

ADDING-CALCULATORS
LISTING MACHINES
BOOKKEEPING MACHINES
CHECK WRITERS
CHECK SIGNERS

MONROE

CALCULATING MACHINE COMPANY, INC.

GENERAL OFFICES · ORANGE, N.J.

Please send me free booklets on Monroe machines.

Name.....

Address.....

MORE THAN 150 MONROE-OWNED BRANCHES SERVE AMERICAN BUSINESS

MONEY . . Typical of how banks depend on Monroes is the First Huntington National Bank (West Virginia). It uses adding-calculators, simplex and grand total listing machines.

CROSBY *for* STAMPINGS

Serving Industry Since 1896

ALL our efforts have been concentrated on one product — STAMPINGS — for 40 years. We have made stampings, deep, intricate, heavy, light, large and small, for nearly every branch of industry.

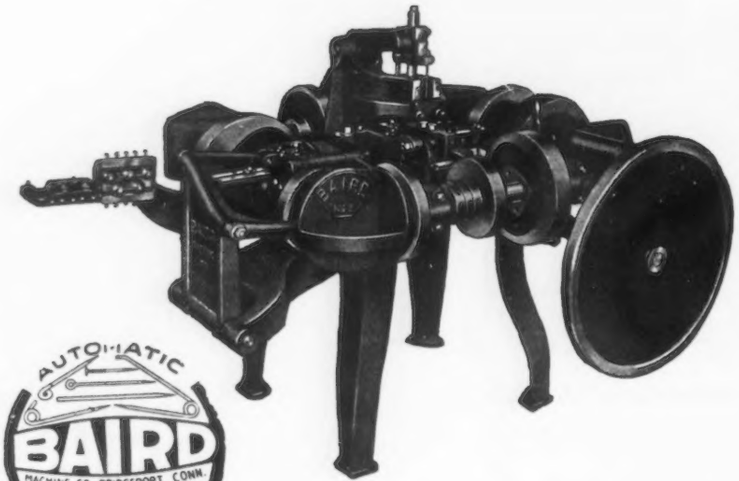
Get Acquainted With Crosby Service

THE CROSBY COMPANY

General Offices and Works: BUFFALO, NEW YORK

Branch Offices: Chicago Detroit Cleveland New York Philadelphia

When Your Costs Rise . . .
"Ask BAIRD About It"



Products won't sell themselves under present day conditions. You still must *sell*, and to do this at a profit you can't overlook your production costs.

In fact, isn't it true that whatever revision of sales prices may lie ahead they will be made necessary because of revised production costs?

If your product contains parts formed from wire or ribbon metal, Baird Automatic Four-slide Wire Forming Machines will prove a big help to you in holding upward revision of the price of your product within reasonable bounds.

"Ask BAIRD About It"

AUTOMATIC BAIRD MACHINE CO. BRIDGEPORT, CONN. MACHINERY

THE BAIRD MACHINE CO. BRIDGEPORT, CONN.

TO AID AND PROTECT INDUSTRIAL DEVELOPMENT IN THE SOUTHEAST


GOVERNOR OF NORTH CAROLINA


GOVERNOR OF SOUTH CAROLINA


GOVERNOR OF ALABAMA


GOVERNOR OF GEORGIA


GOVERNOR OF FLORIDA

WE, THE GOVERNORS . . .

WITH a view to aiding industrial expansion of our section and the stabilization of employment we, the Governors of the Southeastern States, set forth the following objectives:

- **1** *Equitable freight-rates as affect the Southeast.*
- **2** *Uniform taxation policies.*
- **3** *Friendly labor attitude between employer and employee.*
- **4** *Cooperation with Federal Government on proper major policies affecting industrial development.*

It will be our aim by working together on these objectives to maintain conditions favorable to sound industrial development so that the Southeast will reap the full benefits of the ever-increasing trend toward Industrial Decentralization.


GOVERNOR OF LOUISIANA


GOVERNOR OF TENNESSEE


GOVERNOR OF KENTUCKY


GOVERNOR OF MISSISSIPPI

THE SOUTHEAST PAYS NO TRIBUTE TO WINTER

What share of your profits does winter demand? What tribute is taken from your workers' wages by snow and sleet and unrelenting cold?

The underlying factor behind the great trek of industry to the Southeast is its year 'round moderate climate. A climate that reduces capital investment, cuts construction costs, and lowers production costs all along the line. A climate that makes possible better standards of living at *lower living costs* for both labor and management. Investigate the possibilities of a Southeastern location for your type of manufacture. On the basis of *facts* you will, inevitably, come to the conclusion that you can substantially increase profits by placing all or part of your production in the Southeast. And you will find our people ready and anxious to cooperate with you in making your enterprise a success.

Outstanding advantages which the Southeastern States offer to manufacturers are:

Unlimited supply of raw materials.

Ample power at low rates.

Excellent transportation facilities to growing markets.

Native-born labor — efficient and reasonable.

And especially, above all others,

Unexcelled year 'round moderate climate which makes possible:

Lower living costs for better standards of living.

Lower production costs.

Lower construction costs.

Lower capital investment.

LAWRENCE WOOD ROBERT, JR.
Industrial Consultant
Southeastern Governors Conference
Bona Allen Bldg., Atlanta, Georgia

JUST BETWEEN US TWO

Planned Economists Leave Caves

THE Technocrats, who make hay when the sun doesn't shine, are up and around again, dusting off their charts, brushing up on Bellamy's *"Looking Backward,"* and busily scheduling god-knowswhatnot.

Our own idea, that of ordering manufacturers to locate in towns whose names are consonant with the product manufactured, is theirs for the asking. All we ask is that they start on the Frigidaire people and make them move their plant to Frost, Ohio. Of course, the Capewell Horse Nail Company's obvious locusnym is Ney, Ohio.

Ladies' Day

JOHN DOWNING of the Superior Bearings Corp., Indianapolis, writes that the young lady *"who does most of my work for me"* reads this column, and Miss R. Howard of the Central Trading Corp., New York City, tells us she does, too. That gives us four readers among the fair sex, leaving us with fourteen members of the fairer sex to make up the eighteen.

You'll see a section started in your favorite family journal any day now headed, *"Tips on Laundering Undies."*

Light-Hider Tilts Bushel

SOME of the shyer African chiefs are always accompanied by a leather-lunged helper whose duty it is to recite the chief's virtues upon the slightest excuse. Thus the chief continues to enjoy a reputation for becoming modesty without suffering any of the disadvantages that come from lack of advertising.

We often wonder whether the Oberleutnant is right in keeping our light hidden under a bushel. People are always writing in, *"We think The Iron Age is wonderful. Couldn't do without it,"* and do we keep shoving such letters under your aquiline nose? No. The Iron Age shows up in top industrial paper position in one survey after another conducted by advertisers and other publishers? And do we even mention it? No.

But sometimes we fear that perhaps merit is only its own reward and wish we were extroverts like the Buick people who speak right out thus:

> *"You feel the swell and lift of it, the dynamic eager flow of it to the quickening wheels, but you feel it tamed to the firm cool smoothness of polished marble through silk."*

Even though we have never felt polished marble through silk, we get the idea, and even if we didn't the next sentence, *"Every action of this magnificent traveler is a miracle of poise . . ."* would remove any doubts. There is something admirable about such candor, and some time we are going to throw off our inhibitions, get out our bottle of Wilkens Family and shoot the works.

Adam Smith's Bones Rattle

"A CLASSIC!" is one of the milder compliments readers applied to the Nov. 11 editorial, *"The Fable of the Nude Eel."* But as usual "S. W.," the anonymous Chicago heckler, sees a fly in the ointment of the Nov. 18 editorial, *"Social Security in Frogdom,"* and writes:

> *"Please remind J. H. Van Deventer, that flies (consumer goods) are perishable commodities and that frogdom is interested in consuming as many as possible at all times. We can get into debt—one to another to be sure—but we can't consume anything until after it has been produced, so let's not worry about the future. We are not living off the future.* We can't."

Which tops our low brow by yards. We will try it on the oil burner man when he comes around to collect next month's installment.

Air-er

WE observe that the nicer of the radiorators (thank you, *Time*) have taken to smothering the last syllable of *delegate* and *candidate,* making them *delegit* and *candidit*—the ultimate as in the second syllable of *minute*—the sixtieth part of an hour.

The Federal Radio Commission should do something about networks which permit mispronunciations to vibrate the eardrums of millions of unoffending citizens, even though seven-eighths of them are not or is not listening anyway and the other eighth doesn't care.

Fair on Monday

TO our collection of unusual names we add that of a Scranton, Pa., hardware firm—Snee & Sunday, which sounds like a Scotchman's forecast of Sabbath weather.

—A.H.D.

★ *The Annual Review Number of The Iron Age is an institution of many years standing—highly regarded by readers and advertisers.* ★ *The coming Annual will be out on January 6, 1938.* ★ *Make your space reservations now.*

Products Index

Products Index

New Departure Div., General Motors Corp., Bristol, Conn.
Norma-Hoffmann Bearings Corp., Stamford, Conn.
SKF Industries, Inc., Front St. & Erie Ave., Phila., Pa.
Schatz Mfg. Co., Poughkeepsie, N. Y.

BEARINGS, Brass and Bronze
Ampco Metal, Inc., Milwaukee, Wis.
Bunting Brass & Bronze Co., Toledo, O.
Johnson Bronze Co., 505 So. Mill St., New Castle, Pa.
Lawrenceville Bronze Co., Pittsburgh.
National Bearing Metals Corp., Pittsburgh.

BEARINGS—Oilless
Bunting Brass & Bronze Co., Toledo, O.
Rhoades, R. W., Metaline Co., Inc., Long Island City, N. Y.
Richardson Co., The, Melrose Park, Ill.

BEARINGS—Quill
Bantam Bearings Corp., The, South Bend, Indiana.

BEARINGS—Radial
Bantam Bearings Corp., The, South Bend, Indiana.
Federal Bearings Co., Inc., The, Poughkeepsie, N. Y.
Hyatt Bearings Div., General Motors Corp., Newark, N. J.
New Departure Div., General Motors Corp., Bristol, Conn.
Norma-Hoffmann Bearings Corp., Stamford, Conn.
SKF Industries, Inc., Front St. & Erie Ave., Phila., Pa.
Schatz Mfg. Co., The, Poughkeepsie, N. Y.
Shafer Bearing Corp., 35 East Wacker Drive, Chicago.

BEARINGS—Roll Neck
Bantam Bearings Corp., The, South Bend, Indiana.
Morgan Construction Co., Worcester, Mass.
SKF Industries, Inc., Front St. & Erie Ave., Phila., Pa.
Shafer Bearing Corp., 35 East Wacker Drive, Chicago.
Timken Roller Bearing Co., The, Canton, O.

BEARINGS—Roller
Bantam Bearings Corp., The, South Bend, Indiana.
Hyatt Bearings Div., General Motors Corp., Newark, N. J.
Norma-Hoffmann Bearings Corp., Stamford, Conn.
SKF Industries, Inc., Front St. & Erie Ave., Phila., Pa.
Shafer Bearing Corp., 35 East Wacker Drive, Chicago.
Standard Machinery Co., Providence, R. I.
Timken Roller Bearing Co., The, Canton, O.

BEARINGS—Roller Tapered
Bantam Bearings Corp., The, South Bend, Indiana.
Timken Roller Bearing Co., The, Canton, O.

BEARINGS—Rolling Mill Equipment
Bantam Bearings Corp., The, South Bend, Indiana.
Richardson Co., The, Melrose Park, Ill.
SKF Industries, Inc., Front St. & Erie Ave., Phila., Pa.
Timken Roller Bearing Co., The, Canton, O.

BEARINGS—Self-aligning Roller
Shafer Bearing Corp., 35 East Wacker Drive, Chicago.

BEARINGS—Shaft Hanger
Hyatt Bearings Div., General Motors Corp., Newark, N. J.
Norma-Hoffmann Bearings Corp., Stamford, Conn.
SKF Industries, Inc., Front St. & Erie Ave., Phila., Pa.
Shafer Bearing Corp., 35 East Wacker Drive, Chicago.

BEARINGS—Thrust
Bantam Bearings Corp., The, South Bend, Indiana.
Federal Bearings Co., Inc., The, Poughkeepsie, N. Y.
Hyatt Bearings Div., General Motors Corp., Newark, N. J.
New Departure Div., General Motors Corp., Bristol, Conn.
Norma-Hoffmann Bearings Corp., Stamford, Conn.
SKF Industries, Inc., Front St. & Erie Ave., Phila., Pa.
Schatz Mfg. Co., The, Poughkeepsie, N. Y.
Shafer Bearing Corp., 35 East Wacker Drive, Chicago.
Timken Roller Bearing Co., The, Canton, O.

BELT DRESSING
Rhoads, J. E., & Sons, Philadelphia.

BELT LACING
Rhoads, J. E., & Sons, Philadelphia.

BELT—Conveyor, Elevator
Goodyear Tire & Rubber Co., Akron, Ohio.
Goodrich, B. F., Co., The, Akron, Ohio.
Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., The, 2 Townsend St., Passaic, N. J.

BELTING CEMENT
Rhoads, J. E., & Sons, Philadelphia.

BELTING—Leather
Chicago (Ill.) Rawhide Mfg. Co., The, 1306 Elston Ave.
Rhoads, J. E., & Sons, Philadelphia.

BELTING—Metal, Conveyor, High and Low Temperature
Acme Steel Co., Chicago, Ill.
Cambridge (Md.) Wire Cloth Co.
Wickwire Spencer Steel Co., 41 East 42nd St., N. Y. C.

BELTING—Rubber
Goodrich, B. F., Co., The, Akron, Ohio.
Goodyear Tire & Rubber Co., Akron, Ohio.
Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., The, 2 Townsend St., Passaic, N. J.
Robins Conveying Belt Co., 15 Park Row, N. Y. C.

BELTS—V-Type
Allis-Chalmers Mfg. Co., Milwaukee.
Goodyear Tire & Rubber Co., Akron, Ohio.
Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., The, 2 Townsend St., Passaic, N. J.

BENDING MACHINES—Hand, Band and Angle
Excelsior Tool & Mch. Co., E. St. Louis, Ill.

BENDING MACHINES—Hand and Power
Cincinnati (Ohio) Shaper Co., The.
Dreis & Krump Mfg. Co., Chicago.
G. D. S. Machinery & Supply Co., Inc., 101 Walker St., N. Y. C.
Niagara Machine & Tool Works, Buffalo, N. Y.

BENZOL RECOVERY PLANTS
Koppers Co., Pittsburgh.

BERYLLIUM COPPER
American Brass Co., The, Waterbury, Conn.

BILLETS—Chrome Nickel Steel
Rustless Iron & Steel Corp., Baltimore, Md.

BILLETS—Chrome Steel
Rustless Iron & Steel Corp., Baltimore, Md.

BILLETS—Forging
Alan Wood Steel Co., Conshohocken, Pa.
Harrisburg (Pa.) Steel Corp.
Midvale Co., The, Nicetown, Phila., Pa.
Republic Steel Corp., Cleveland, Ohio.

BILLETS—Re-rolling
Alan Wood Steel Co., Conshohocken, Pa.

BILLETS—Steel
Bethelhem (Pa.) Steel Company.
Continental Steel Corp., Kokomo, Ind.
Tennessee Coal, Iron & Railroad Co. (U. S. Steel Corp. Subsidiary), Birmingham, Ala.

BIMETAL—Thermostatic
Chace, W. M., Co., 1605 Beard Ave., Detroit.

BINS—Rotating
Frick-Gallagher Mfg. Co., The, Wellston, Ohio.

BLANKS—Chisel
Cleveland Steel Tool Co., The, 660 E. 82nd St., Cleveland, Ohio.

BLANKS—Gear and Pinion
Chicago (Ill.) Rawhide Mfg. Co., The, 1306 Elston Ave.
Richardson Co., The, Melrose Park, Ill.

BLANKS—Gear, Silent Steel
Waldron, John, Corp., New Brunswick, N. J.

BLAST CLEANING EQUIPMENT
American Foundry Equipment Co., The, 401 Byrkit St., Mishawaka, Ind.
Pangborn Corporation, Hagerstown, Md.

BLAST FURNACES
Brassert, H. A., & Co., Chicago, Ill.

BLAST GATES
Rockwell, W. S., Co., 50 Church St., N. Y. C.

BLOCKS—Chain
Yale & Towne Mfg. Co., The, Phila. Div., Phila., Pa.

BLOWERS
American Air Filter Co., Inc., Louisville, Ky.
American Blower Corp., 6000 Russell St., Detroit.
Ingersoll-Rand Co., 11 Broadway, N. Y. C.
North American Mfg. Co., The, Cleveland
Spencer Turbine Co., Hartford, Conn.

BLOWPIPES—Oxy-Acetylene Welding & Cutting
Linde Air Products Company, The, 30 East 42nd St., N. Y. C.
Weldit Acetylene Co., Detroit.

BLOWPIPES — Soldering, Heating, Annealing
American Gas Furnace Co., Elizabeth, N. J.
Weldit Acetylene Co., Detroit.

BOILERS
Munroe R., & Sons Mfg. Corp., Pittsburgh.

BOILERS—Waste Heat
Babcock & Wilcox Co., The, 85 Liberty St., New York City.

BOILERS—Water Tube
Babcock & Wilcox Co., The, 85 Liberty St., New York City.

BOLT CUTTERS
Acme Machinery Co., Cleveland.
Landis Mch. Co., Inc., Waynesboro, Pa.

BOLT AND NUT MACHINERY
Acme Machinery Co., Cleveland.
Ajax Mfg. Co., The, Euclid, Ohio.
Landis Machine Co., Inc., Waynesboro, Pa.
Manville, E. J., Mch. Co., Waterbury, Ct.
Waterbury (Ct.) Farrel Fdry. & Mch. Co., The.

BOLT & RIVET CLIPPERS
Bremil Mfg Co., Erie, Pa.
Helwig Mfg. Co., St. Paul, Minn.

BOLTS—Carriage and Machine
Cleveland (Ohio) Cap Screw Co., The
Erie (Pa.) Bolt & Nut Co.
Lamson & Sessions Co., The, Cleveland.
Oliver Iron & Steel Corp., Pittsburgh.
Republic Steel Corp., Upson Nut Div., Cleveland, O.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.

Products Index

BOLTS—Special
Erie (Pa.) Bolt & Nut Co.
Lamson & Sessions Co., The, Cleveland.
Oliver Iron & Steel Corp., Pittsburgh.
Republic Steel Corp., Upson Nut Div., Cleveland, O.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.

BOLTS—Special, Hot or Cold Upset
Lamson & Sessions Co., The, Cleveland.
Oliver Iron & Steel Corp., Pittsburgh.

BOLTS—Stove
Blake & Johnson Co., The, Waterville, Ct.
Lamson & Sessions Co., The, Cleveland.

BOLTS—Track
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Republic Steel Corp., Upson Nut Div., Cleveland, O.

BOLTS AND NUTS
Clark Bros. Bolt Co., Milldale, Conn.
Erie (Pa.) Bolt & Nut Co.
Lamson & Sessions Co., The, Cleveland.
Oliver Iron & Steel Corp., Pittsburgh.
Republic Steel Corp., Cleveland, Ohio.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.

BOLTS AND NUTS—Self-Locking
Lamson & Sessions Co., The, Cleveland, O.

BOND—Grinding Wheel
Bakelite Corp., 247 Park Ave., N. Y. C.

BOOTHS—Spray
DeVilbiss Co., The, Toledo, Ohio.

BORING BARS
Bullard Co., The, Bridgeport, Conn.

BORING, DRILLING & MILLING MACHINES—Horizontal
Hill-Clarke Mchry. Co., 647 W. Washington Blvd., Chicago.
Lucas Machine Tool Co., Cleveland.
National Automatic Tool Co., Richmond Ind.

BORING & DRILLING MACHINES—Vertical
Baker Bros., Inc., Toledo, Ohio.
Bullard Co., The, Bridgeport, Conn.

BORING MACHINES—Diamond
Ex-Cell-O Corp., 1200 Oakman Blvd., Detroit.

BORING MACHINES—Diamond & Carbide Tools
Heald Mch. Co., Worcester, Mass.

BORING MACHINES—Jig
Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.

BORING & TURNING MILLS—Vertical
Bullard Co., The, Bridgeport, Conn.
Cincinnati (Ohio) Planer Co.
Rogers Machine Wks., Alfred, New York.

BOX STRAPPING
Acme Steel Co., Chicago, Ill.

BRAKE LINING AND BLOCKS—Asbestos
Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., The, 2 Townsend St., Passaic, N. J.

BRAKES—Electric
Cutler-Hammer, Inc., Milwaukee.

BRAKES—Electric & Mechanical
Electric Controller & Mfg. Co., The, Cleveland.

BRAKES—Magnetic
Stearns Magnetic Mfg. Co., 635 So. 28th St., Milwaukee.

BRAKES—Metal Forming
Cincinnati (Ohio) Shaper Co., The.
Dreis & Krump Mfg. Co., Chicago.
Peck, Stow & Wilcox Co., The, Southington, Conn.
Schatz Mfg. Co., The, Poughkeepsie, N. Y.
Steelweld Machinery Co., Cleveland.

BRICK—Acid Resisting
Keagler Brick Co., Steubenville, Ohio.

BRICK—Fire Clay
Carborundum Co., The, Niagara Falls, N. Y.
Illinois Clay Products Co., Joliet, Ill.
Keagler Brick Co., Steubenville, Ohio.
Quigley Co., Inc., 56 West 45th St., N. Y. C.

BRICK—Insulating
Babcock & Wilcox Co., The, 85 Liberty St., New York City.

BRIDGE BUILDERS
American Bridge Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.
Belmont Iron Works, Philadelphia.

BRIDGE OPERATING MACHINERY—Movable
Earle Gear & Mch. Co., Philadelphia.

BRIQUETS—Ferroalloy
Electro Metallurgical Sales Corp., 30 East 42nd St., N. Y. C.

BROACHING MACHINES
Bullard Co., The, Bridgeport, Conn.
Cincinnati (Ohio) Milling Mch. Co., The.
Oilgear Co., The, 1311 W. Bruce St., Milwaukee.

BRONZE FOR DIES
Ampco Metal, Inc., Milwaukee, Wis.

BRONZE—Phosphor
Bunting Brass & Bronze Co., Toledo, Ohio.
Phosphor Bronze Smelting Co., The, Phila.
Revere Copper & Brass, Inc., 230 Park Ave., N. Y. C.
Seymour (Conn.) Mfg. Co.

BRUSHES—Machine
Pittsburgh Plate Glass Co., Brush Div., Baltimore, Md.

BRUSHES—Wire
Pittsburgh Plate Glass Co., Brush Div., Baltimore, Md.

BUCKETS—Clamshell
Blaw-Knox Co., Pittsburgh.
Hayward Co., The, 50 Church St., N. Y. C.
Industrial Brownhoist Corp., Bay City, Mich.

BUCKETS—Electric Motor
Hayward Co., The, 50 Church St., N. Y. C.

BUCKETS—Orange Peel
Hayward Co., The, 50 Church St., N. Y. C.

BUFFERS & POLISHING MACHINES
Packer Machine Co., The, Meriden, Conn.

BUFFING APPLICATORS—Automatic
Packer Machine Co., The, Meriden, Conn.

BUILDINGS—Factory
Ferguson, H. K., Co., The, Cleveland.

BUILDINGS—Steel
American Bridge Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.
Belmont Iron Works, Philadelphia.
Bethlehem (Pa.) Steel Co.
Blaw-Knox Co., Pittsburgh.
Ferguson, H. K., Co., The, Cleveland.
Iron & Steel Products, Inc., Chicago.

BULLDOZERS
Ajax Mfg. Co., The, Euclid, Ohio.
Beatty Mch. & Mfg. Co., 936—150th St., Hammond, Ind.
Steelweld Machinery Co., Cleveland.

BULLDOZERS—Hydraulic
Elmes, Chas. F., Engng. Wks., Chicago.

BURNERS—Oil or Gas
North American Mfg. Co., The, Cleveland.
Wilson, Lee Engineering Co., The, Cleveland.

BUSHINGS—Bronze
Ampco Metal, Inc., Milwaukee, Wis.
Bunting Brass & Bronze Co., Toledo, O.
Johnson Bronze Co., 505 So. Mill St., New Castle, Pa.
Lawrenceville Bronze Co., Pittsburgh.
Phosphor Bronze Smelting Co., The, Phila.
Shenango-Penn Mold Co., Pittsburgh.

BUSHINGS—Oilless
Rhoades, R. W., Metaline Co., Inc., Long Island City, N. Y.

BUSHINGS—Phosphor Bronze
Bunting Brass & Bronze Co., Toledo, Ohio.
Phosphor Bronze Smelting Co., The, Phila.

BY-PRODUCTS COKE AND GAS OVENS
Koppers Co., Pittsburgh.

CABINETS—Stock
Frick-Gallagher Mfg. Co., The, Wellston, Ohio.

CABLE—Electric
General Electric Co., Schenectady, N. Y.
Lincoln Electric Co., The, Cleveland.

CABLEWAYS AND TRAMWAYS—See Tramways

CADMIUM
Du Pont de Nemours, E. I., & Co., Inc., Grasselli Chemicals Dept., Wilmington, Del.
Udylite Co., The, Detroit.

CADMIUM PLATING PROCESS
Du Pont de Nemours, E. I., & Co., Inc., Grasselli Chemicals Dept., Wilmington, Del.
Udylite Co., The, Detroit.

CALCIUM METAL & ALLOYS
Electro Metallurgical Sales Corp., 30 East 42nd St., N. Y. C.

CALCULATING MACHINES
Monroe Calculating Machine Co., Inc., Orange, N. J.

CARBIC
Linde Air Products Company, The, 30 East 42nd St., N. Y. C.

CARBIDE
Air Reduction Sales Co., 60 East 42nd St., N. Y. C.
Linde Air Products Company, The, 30 East 42nd St., N. Y. C.

CARBIDE—Boron
Norton Co., Worcester, Mass.

CARBURIZING BOXES
Electro Alloys Co., Elyria, Ohio.

CARBURIZING—See Heat Treating

CARS—Railway
Iron & Steel Products, Inc., Chicago.

CARS—Industrial and Mining
Atlas Car & Mfg. Co., The, Cleveland.
Bartlett, C. O.-Snow Co., The, Cleveland.

CASE HARDENING—See Heat Treating

CASTINGS—Acid or Heat Resisting
Ampco Metal, Inc., Milwaukee, Wis.
Duriron Co., Inc., The, 438 N. Findlay St., Dayton, Ohio.
Electro Alloys Co., Elyria, Ohio.
Hoskins Mfg. Co., Detroit, Mich.
Lebanon (Pa.) Steel Foundry.
Midvale Co., The, Nicetown, Phila., Pa.
Meehanite Metal Corp., Pittsburgh.

CASTINGS—Alloy Iron
Forging & Casting Corp., The, Ferndale, Mich.

CASTINGS—Alloy Steel
Bissett Steel Co., The, Cleveland.
Dodge Steel Co., Philadelphia, Pa.
Electro Alloys Co., Elyria, Ohio.
Hartford (Conn.) Electric Steel Corp.
Lebanon (Pa.) Steel Foundry.
Mackintosh-Hemphill Co., Pittsburgh.
Midvale Co., The, Nicetown, Phila., Pa.

Products Index

CASTINGS—Aluminum
Aluminum Co. of America, Pittsburgh.
Fairmount Foundry, Inc., Phila., Pa.

CASTINGS—Brass, Bronze, Copper or Aluminum
Cadman, A. W., Mfg. Co., Pittsburgh.
Carbon Malleable Casting Co., Inc., Lancaster, Pa.
Lawrenceville Bronze Co., Pittsburgh.
National Bearing Metals Corp., Pittsburgh.
Phosphor Bronze Smelting Co.,The, Phila.
Snyder, W. P., & Co., Pittsburgh.
Spencer's, I. S., Sons, Inc., Guilford, Ct.

CASTINGS—Corrosion Resisting
Electro Alloys Co., Elyria, Ohio.
Meehanite Metal Corp., Pittsburgh.
Midvale Co., The, Nicetown, Phila., Pa.

CASTINGS—Die, Aluminum
Aluminum Co. of America, Pittsburgh.

CASTINGS—Electric Steel
Crucible Steel Castings Co., Lansdowne, Pa.
Dodge Steel Co., Philadelphia, Pa.
Lebanon (Pa.) Steel Foundry.

CASTINGS—Gray Iron
American Engineering Co., Philadelphia.
Cheney, S., & Son, Manlius, N. Y.
Commercial Steel Casting Co., Marion, Ohio.
Fairmount Foundry, Inc., Phila., Pa.
Laconia (N. H.) Malleable Iron Co., Inc.
Lane Mfg. Co., Montpelier, Vt.
Midvale Co., The, Nicetown, Phila., Pa.
Murray Iron Wks. Co., Burlington, Iowa.
National Roll & Fdry. Co., Avonmore, Pa.
North Wales (Pa.) Mach. Co., Inc.
Spencer's, I. S., Sons, Inc., Guilford, Ct.

CASTINGS—High Test & Alloy Iron
Meehanite Metal Corp., Pittsburgh.

CASTINGS—Magnesium Alloys
Dow Chemical Co., The, 921 Jefferson Ave., Midland, Mich.

CASTINGS—Malleable
Baltimore (Md.) Malleable Iron & Steel Casting Co.
Carbon Malleable Casting Co., Inc., Lancaster, Pa.
Laconia (N. H.) Malleable Iron Co., Inc.
Lake City Malleable Co., The, 5100 Lakeside Ave., Cleveland.
Malleable Iron Fittings Co., Branford, Ct.
Peoria (Ill.) Malleable Castings Co.

CASTINGS—Meehanite Metal
Meehanite Metal Corp., Pittsburgh.

CASTINGS—Monel & Nickel
Superior Bronze Corp., Erie, Pa.

CASTINGS—Semi-Steel
Malleable Iron Fittings Co., Branford, Ct.

CASTINGS—Steel
Bethlehem (Pa.) Steel Company.
Birdsboro (Pa.) Steel Foundry & Machine Co.
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Columbia Steel Co. (U. S. Steel Corp. Subsidiary), San Francisco, Calif.
Commercial Steel Casting Co., Marion, Ohio.
Crucible Steel Castings Co., Lansdowne,Pa.
Dodge Steel Co., Philadelphia, Pa.
Hartford (Conn.) Electric Steel Corp.
Lebanon (Pa.) Steel Foundry.
Mackintosh-Hemphill Co., Pittsburgh.
Malleable Iron Fittings Co., Branford, Ct.
Mesta Mch. Co., Pittsburgh.
Midvale Co., The, Nicetown, Phila., Pa.
Standard Steel Wks. Co., Burnham, Pa.

CASTINGS—Wear Resisting
Meehanite Metal Corp., Pittsburgh.

CEMENT—Acid-Proof
Atlas Mineral Products Co. of Pa., The, Mertztown, Pa.
Nukem Products Corp., 68 Niagara St., Buffalo, N. Y.
Pennsylvania Salt Mfg. Co., Philadelphia, Pa.

CEMENT—Refractory
Carborundum Co., The, Perth Amboy, N. J.
Johns-Manville Corp., 22 East 40th St., New York City.
Quigley Co., Inc., 56 West 45th St., N. Y. C.

CEMENT—Rubber
Goodrich, B. F., Co., The, Akron, Ohio.

CHAINS—Conveyor & Elevator
Baldwin-Duckworth Chain Corp., Springfield, Mass.
Bartlett, C. O.-Snow Co., The, Cleveland.
Diamond Chain & Mfg. Co., Indianapolis, Ind.
Webster Mfg. Co., Chicago.

CHAINS—Portable
Barrett-Cravens Co., Chicago, Illinois

CHAINS—Power Transmission
Baldwin-Duckworth Chain Corp., Springfield, Mass.
Boston Gear Works, Inc., North Quincy, Mass.
Diamond Chain & Mfg. Co., Indianapolis, Ind.
Link-Belt Co., Chicago.
Morse Chain Co., Ithaca, New York.
Ramsey Chain Co., Inc., Albany, N. Y.
Webster Mfg. Co., Chicago.
Whitney Chain & Mfg. Co., Hartford, Ct.

CHAINS—Roller
Baldwin-Duckworth Chain Corp., Springfield, Mass.
Bartlett, C. O.-Snow Co., The, Cleveland.
Diamond Chain & Mfg. Co. Indianapolis, Ind.
Link-Belt Co., Chicago.
Morse Chain Co., Ithaca, New York.
Whitney Chain & Mfg. Co., Hartford, Ct.

CHAINS—Silent
Link-Belt Co., Chicago.
Morse Chain Co., Ithaca, New York.
Ramsey Chain Co., Inc., Albany, N. Y.
Whitney Chain & Mfg. Co., Hartford, Ct.

CHANNELS—See Angles, Beams, Channels and Tees

CHECKS—Metal
Cunningham, M. E., Co., Pittsburgh.
Noble & Westbrook Mfg. Co., The, East Hartford, Ct.

CHEMICALS—Industrial
Du Pont de Nemours, E. I., & Co., Inc., Grasselli Chemicals Dept., Wilmington, Del.
Pennsylvania Salt Mfg. Co., Philadelphia, Pa.

CHEMICALS—Rust Proofing
Parker Rust-Proof Co., 2186 Milwaukee Ave., Detroit.
Udylite Co., The, Detroit.

CHROMIUM METAL & ALLOYS
Electro Metallurgical Sales Corp., 30 East 42nd St., N. Y. C.

CHUCKING MACHINES—Multiple Spindle
Baird Mch. Co., The, Bridgeport, Conn.
Goss & DeLeeuw Machine Co., New Britain, Conn.
National Acme Co., The, Cleveland.

CHUCKS—Air Operated
Hanniffin Mfg. Co., Chicago.

CHUCKS—Drill
Cleveland (Ohio) Twist Drill Co., The.
Cushman Chuck Co., Hartford, Conn.
Morse Twist Drill & Mach. Co., New Bedford, Mass.

CHUCKS—Electric
Cushman Chuck Co., Hartford, Conn.

CHUCKS—Lathe
Cushman Chuck Co., Hartford, Conn.

CHUCKS—Magnetic
Heald Mch. Co., Worcester, Mass.
Taft-Peirce Mfg. Co.,The,Woonsocket,R.I.

CIRCLES—Phosphor Bronze
Phosphor Bronze Smelting Co.,The, Phila.
Revere Copper & Brass, Inc., 230 Park Ave., N. Y. C.

CLEANERS—Metal
American Chemical Paint Co., Ambler, Pa.
Detroit Rex Products Co., Detroit, Mich.
Ford, J. B., Co., The, Wyandotte, Mich.
Pennsylvania Salt Mfg. Co., Phila., Pa.

CLEANING COMPOUNDS—Alkali
Detroit Rex Products Co., Detroit, Mich.
Pennsylvania Salt Mfg. Co., Philadelphia, Pa.

CLEANING EQUIPMENT—Metal
Detroit Rex Products Co., Detroit, Mich.

CLEANING EQUIPMENT (Metal)—Electro-Chemical
Bullard Co., The, Bridgeport, Conn.

CLOTHING—Asbestos & Fireproof
Safety Equipment Service Co., Cleveland.

CLUTCH-BRAKES—Magnetic
Stearns Magnetic Mfg. Co., 635 So. 28th St., Milwaukee.

CLUTCHES
Fairbanks, Morse & Co., Chicago.
Falls Clutch & Mchry. Co., The, Cuyahoga Falls, Ohio.
Jones, W. A., Fdry. & Mch. Co., 4401 Roosevelt Rd., Chicago.
Medart Co., The, St. Louis, Mo.
Morse Chain Co., Ithaca, New York.

CLUTCHES—Magnetic
Cutler-Hammer, Inc., Milwaukee.
Dings Magnetic Separator Co., Milwaukee.
Stearns Magnetic Mfg. Co., 635 So. 28th St., Milwaukee.

COAL
Cleveland-Cliffs Iron Co., The, Cleveland, Ohio.
Hanna Furnace Corp., The, Detroit, Mich.
Koppers Coal Co., Inc., The, Pittsburgh.
Pickands Mather & Co., Cleveland.

COAL, ORE AND ASH HANDLING MACHINERY
Bartlett, C. O.-Snow Co., The, Cleveland.
Robins Conveying Belt Co., 15 Park Row, N. Y. C.
Webster Mfg. Co., Chicago.

COBALT METAL
Central Trading Corp., 511 Fifth Ave., N. Y. C.

COILS—Lead
National Lead Co., 111 Bdway., N. Y. C.

COILS—Pipe
Harrisburg (Pa.) Steel Corp.

COKE—Metallurgical
Cleveland-Cliffs Iron Co., The, Cleveland, Ohio.
Pickands Mather & Co., Cleveland.

COKE OVEN MACHINERY
Atlas Car & Mfg. Co., The, Cleveland.
Koppers Co., Pittsburgh.

COKE OVENS—By-Products
Koppers Co., Pittsburgh.

COKE OVENS—Cross Regenerators
Koppers Co., Pittsburgh.

COKE OVENS—With Recovery of By-Products
Koppers Co., Pittsburgh.

COLLETS
Rivett Lathe & Grinder, Inc., Boston, Mass.

COLUMBIUM
Electro Metallurgical Sales Corp., 30 E. 42nd St., N. Y. C.

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COMBUSTION CONTROLS
Brown Instrument Co., The, Philadelphia, Pa.
Leeds & Northrup Co., Philadelphia.
Morgan Construction Co., Worcester, Mass.
North American Mfg. Co., The, Cleveland.

COMPOUNDS—Drawing
Gulf Oil Corp., Gulf Refining Co., Pittsburgh.
Socony-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.
Standard Oil Co. (Indiana), Chicago.
Tide Water Associated Oil Co., 17 Battery Place, N. Y. C.

COMPRESSORS—Air
Curtis Pneumatic Machinery Co., 1948 Kienlen Ave., St. Louis, Mo.
Fairbanks, Morse & Co., Chicago.
Ingersoll-Rand Co., 11 Broadway, New York City.
Pennsylvania Pump & Compressor Co., Easton, Pa.
Spencer Turbine Co., Hartford, Conn.
Sullivan Machinery Co., Michigan City, Ind.
Westinghouse Air Brake Co., Industrial Div., Pittsburgh.
Worthington Pump & Machinery Corp., Harrison, N. J.

COMPRESSORS—Gas
Sullivan Machinery Co., Michigan City, Ind.
Worthington Pump & Machinery Corp., Harrison, N. J.

COMPRESSORS—Rebuilt. (See Clearing House Section)

CONCRETE CONSTRUCTION
Ferguson, H. K., Co., The, Cleveland.

CONDENSERS—Surface & Jet
Ingersoll-Rand Co., 11 Broadway, N.Y.C.
Pennsylvania Pump & Compressor Co., Easton, Pa.
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.
Worthington Pump & Machinery Corp., Harrison, N. J.

CONDUITS—Flexible Metallic
Pennsylvania Flexible Metallic Tubing Co., Philadelphia.

CONTRACTORS' SUPPLIES — Second-Hand. (See Clearing House Section)

CONTROL SYSTEMS—Temperature
Leeds & Northrup Co., Philadelphia.

CONTROLLERS—Crane
Cutler-Hammer, Inc., Milwaukee.

CONTROLLERS—Electric
Cutler-Hammer, Inc., Milwaukee.
Electric Controller & Mfg. Co., The, Cleveland.
General Electric Co., Schenectady, N. Y.

CONTROLLERS—Valve, Electrically Operated
Brown Instrument Co., The, Philadelphia, Pa.
Cutler-Hammer, Inc., Milwaukee.
Leeds & Northrup Co., Philadelphia.

CONVEYING AND ELEVATING MACHINERY
Bartlett, C. O.-Snow Co., The, Cleveland.
Link-Belt Co., Chicago.
Logan Co., Inc., Louisville, Ky.
Mathews Conveyer Co., Ellwood City, Pa.
Robins Conveying Belt Co., 15 Park Row, N. Y. C.

CONVEYOR WORMS
Lee Spring Co., Inc., 30 Main St., Brooklyn, N. Y.

CONVEYORS—Gravity
Logan Co., Inc., Louisville, Ky.
Mathews Conveyer Co., Ellwood City, Pa.

CONVEYORS—Monorail
American Monorail Co., The, Cleveland.
Cleveland Tramrail Div. of The Cleveland Crane & Engng. Co., Wickliffe, Ohio.

CONVEYORS—Portable
Farquhar, A. B., Co., Ltd., York, Pa.
Robins Conveying Belt Co., 15 Park Row, N. Y. C.

COPING MACHINES
Schatz Mfg. Co., The, Poughkeepsie, N. Y.

CORE OIL
Socony-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.
Sun Oil Co., Philadelphia.
Tide Water Associated Oil Co., 17 Battery Place, N. Y. C.

CORUNDUM WHEELS — See Grinding Wheels

COTTERS AND KEYS—Spring
Hindley Mfg. Co., Valley Falls, R. I.
Hubbard, M. D., Spring Co., 750 Central Ave., Pontiac, Mich.
Lamson & Sessions Co., The, Cleveland.
Western Wire Prods. Co., St. Louis, Mo.

COUNTERBORES
Cleveland (Ohio) Twist Drill Co., The.
Morse Twist Drill & Mch. Co., New Bedford, Mass.

COUNTERS—Production
Durant Mfg. Co., Milwaukee, Wis.
Veeder-Root, Inc., Hartford, Ct.

COUNTERS—Revolution, Recording
Durant Mfg. Co., Milwaukee, Wis.

COUNTING MACHINES
Veeder-Root, Inc., Hartford, Conn.

COUPLINGS—Air Hose
Cleveland (Ohio) Pneumatic Tool Co., The.

COUPLINGS—Cut-off Friction
Jones, W. A., Fdry. & Mch. Co., 4401 Roosevelt Rd., Chicago.

COUPLINGS—Flexible
Diamond Chain & Mfg. Co., Indianapolis, Ind.
Lovejoy Flexible Coupling Co., Chicago.
Morse Chain Co., Ithaca, New York.
Poole Foundry & Mch. Co., Baltimore, Md.
Ramsey Chain Co., Inc., Albany, N. Y.
Waldron, John, Corp., New Brunswick, N. J.

COUPLINGS—Pipe
Harrisburg (Pa.) Steel Corp.
National Tube Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.

CRANES—Crawling Tractor
Browning Crane & Shovel Co., Cleveland.
Harnischfeger Corp., 4401 W. National Ave., Milwaukee.
Industrial Brownhoist Corp., Bay City, Mich.
Ohio Locomotive Crane Co., The, Bucyrus, Ohio.

CRANES — Electric, Industrial, Truck Mounted
Baker-Raulang Co., The, 2175 W. 25th St., Cleveland.
Browning Crane & Shovel Co., Cleveland.
Elwell-Parker Electric Co., The, Cleveland.

CRANES—Electric Traveling
Armel, James P., Pittsburgh.
Cleveland Crane & Engineering Co., Wickliffe, Ohio.
Conco Engineering Works, Mendota, Ill.
Curtis Pneumatic Machinery Co., 1948 Kienlen Ave., St. Louis, Mo.
Electric Hoist & Motor Co., 149 N. 9th St., Bklyn., N. Y.
Euclid Crane & Hoist Co., The, Euclid, O.
Harnischfeger Corp., 4401 W. National Ave., Milwaukee, Wis.
Maris Brothers, Inc., Philadelphia.
Morgan Engineering Co., The, Alliance, O.
Northern Engineering Works, Detroit, Mich.
Robbins & Myers, Inc., Springfield, Ohio.
Shaw-Box Crane & Hoist Div. Manning, Maxwell & Moore, Inc., 402 Broadway, Muskegon, Mich.
Shepard Niles Crane & Hoist Corp., Montour Falls, N. Y.
Whiting Corp., Harvey, Ill.

CRANES—Gantry
Browning Crane & Shovel Co., Cleveland.
Cleveland Crane & Engineering Co., Wickliffe, Ohio.
Harnischfeger Corp., 4401 W. National Ave., Milwaukee.
Morgan Engineering Co., The, Alliance, O.
Whiting Corp., Harvey, Ill.

CRANES—Hand Power
American Monorail Co., The, Cleveland.
Cleveland Crane & Engineering Co., Wickliffe, Ohio.
Cleveland Tramrail Div. of The Cleveland Crane & Engng. Co., Wickliffe, Ohio.
Conco Engineering Works, Mendota, Ill.
Curtis Pneumatic Machinery Co., 1948 Kienlen Ave., St. Louis, Mo.
Euclid Crane & Hoist Co., The, Euclid, O.
Harnischfeger Corp., 4401 W. National Ave., Milwaukee.
Industrial Brownhoist Corp., Bay City, Mich.
Maris Brothers, Inc., Philadelphia.
Northern Engineering Works, Detroit.
Shaw-Box Crane & Hoist Div. Manning, Maxwell & Moore, Inc., 402 Broadway, Muskegon, Mich.

CRANES—Jib
American Monorail Co., The, Cleveland.
Cleveland Tramrail Div. of the Cleveland Crane & Engng. Co., Wickliffe, Ohio.
Conco Engineering Works, Mendota, Ill.
Euclid Crane & Hoist Co., The, Euclid, O.
Shaw-Box Crane & Hoist Div. Manning, Maxwell & Moore, Inc., 402 Broadway, Muskegon, Mich.
Whiting Corp., Harvey, Ill.

CRANES—Locomotive
Browning Crane & Shovel Co., Cleveland.
Harnischfeger Corp., 4401 W. National Ave., Milwaukee.
Industrial Brownhoist Corp., Bay City, Mich.
Ohio Locomotive Crane Co., The, Bucyrus, O.

CRANES—Monorail
American Monorail Co., The, Cleveland.
Cleveland Tramrail Div. of The Cleveland Crane & Engng. Co., Wickliffe, Ohio.
Euclid Crane & Hoist Co., The, Euclid, O.
Northern Engineering Works, Detroit.
Shaw-Box Crane & Hoist Div. Manning, Maxwell & Moore, Inc., 402 Broadway, Muskegon, Mich.
Shepard Niles Crane & Hoist Corp., Montour Falls, N. Y.

CRANES—Portable
Canton Fdry. & Mch. Co., Cleveland.

CRANES—Portable Electric
Baker-Raulang Co., The, 2175 W. 25th St., Cleveland.
Elwell-Parker Electric Co., The, Cleveland.

CRANKSHAFTS
Transue & Williams Steel Forging Corp., Alliance, Ohio.
Union Drawn Steel Co., Massillon, Ohio.

CRANKSHAFTS—Forged
Bay City Forge Co., Erie, Pa.

CRUSHERS—Coal
American Pulverizer Co., 1439 Macklind Ave., St. Louis, Mo.

CRUSHERS—Steel Turning
American Pulverizer Co., 1439 Macklind Ave., St. Louis, Mo.

CUTTERS—Die Sinking
Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.
Tomkins-Johnson Co., The, Jackson, Mich.

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CUTTERS—Keyseating
Davis Keyseater Co., 400 Exchange St. Rochester, N. Y.

CUTTERS—Milling
Brown & Sharpe Mfg. Co., Providence, R. I.
Cleveland (Ohio) Twist Drill Co., The.
Ex-Cell-O Corp., 1200 Oakman Blvd., Detroit.
Morse Twist Drill & Mch. Co., New Bedford, Mass.
Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.

CUTTING-OFF MACHINES—Abrasives
Tabor Mfg. Co., Phila.

CUTTING-OFF MACHINES—Cold Saw
Espen-Lucas Mch. Wks., Philadelphia.

CUTTING-OFF MACHINES—Pipe or Tubing
Aetna-Standard Engineering Co., The, Youngstown, Ohio.
Bardons & Oliver, Cleveland.
Landis Mch. Co., Inc., Waynesboro, Pa.

CUTTING AND WELDING APPARATUS—Oxy-Acetylene—See Welding and Cutting Machines and Equipment—Oxy-Acetylene.

CYLINDERS — Compressed Air & Hydraulic
Hanna Engineering Works, 1761 Elston Ave., Chicago.
Tomkins-Johnson Co., The, Jackson, Mich.

CYLINDERS—Seamless
Harrisburg (Pa.) Steel Corp.
National Tube Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.

DEGREASING COMPOUNDS
Pennsylvania Salt Mfg. Co., Philadelphia, Pa.

DEGREASING MACHINES—Solvent
Detroit Rex Products Co., Detroit, Mich.

DEOXIDIZERS
Vanadium Corp. of America, 420 Lexington Ave., N. Y. C.

DICTATING MACHINES
Dictaphone Sales Corp., 420 Lexington Ave., New York City.

DIE-FILING MACHINES
Continental Machine Specialties, Inc., Minneapolis, Minn.

DIE SETS
U. S. Tool Co., Inc., Ampere, N. J.

DIE SINKING MACHINES — Automatic and Hand
Cincinnati (Ohio) Milling Mch. Co., The.
Pratt & Whitney Div., Niles-Bement-Pond Co., Hartford, Conn.

DIEING MACHINES—Automatic
Henry & Wright Mfg. Co., The, Hartford, Conn.

DIES—Cast Tool Steel
Forging & Casting Corp., The, Ferndale, Mich.

DIES, JIGS, FIXTURES, etc.
Atlantic Mfg. Co., Philadelphia.
Taft-Peirce Mfg. Co.,The,Woonsocket,R. I.

DIES—Pipe Threading
Landis Mch. Co., Inc., Waynesboro, Pa.
Murchey Machine & Tool Co., Detroit.

DIES—Screw and Thread Cutting
Eastern Mach. Screw Corp., New Haven, Ct.
Greenfield (Mass.) Tap & Die Corp.
Jones & Lamson Mch. Co., Springfield, Vt.
Landis Mch. Co., Inc., Waynesboro, Pa.
Murchey Machine & Tool Co., Detroit.

DIES—Self-Opening Adjustable
Eastern Mach. Screw Corp., New Haven, Ct.
Jones & Lamson Mch. Co., Springfield, Vt.
Landis Mch. Co., Inc., Waynesboro, Pa.
Murchey Machine & Tool Co., Detroit.
National Acme Co., The, Cleveland.

DIES—Sheet Metal Working
Worcester (Mass.) Stamped Metal Co.

DIES—Steel Letters and Stamps
Cunningham, M. E., Co., Pittsburgh.
Noble & Westbrook Mfg. Co., The, East Hartford, Ct.

DOORS & SHUTTERS, Fireproof
Kinnear Mfg. Co., Columbus, Ohio.

DOORS & SHUTTERS—Steel or Wood Rolling
Kinnear Mfg. Co., Columbus, Ohio.

DRAWN WORK—Metal—See Stampings or Drawings—Metal

DRILL FILING SYSTEMS
Huot Mfg. Co., 500 Robert St., St. Paul, Minn.

DRILL HEADS—Hydraulic
National Automatic Tool Co.,Richmond,Ind.

DRILL HEADS—Multiple
Baker Bros., Inc., Toledo, Ohio.
Ex-Cell-O Corp., 1200 Oakman Blvd., Detroit.

DRILL INDEX
Huot Mfg. Co., 500 Robert St., St. Paul, Minn.

DRILLING MACHINES—Bench
Leland-Gifford Co., Worcester, Mass.

DRILLING MACHINES—Heavy Duty
Baker Bros., Inc., Toledo, Ohio.

DRILLING MACHINES—Multiple Spindle
Baker Bros., Inc., Toledo, Ohio.
Henry & Wright Mfg. Co., The, Hartford Conn.
National Automatic Tool Co., Richmond Ind.

DRILLING MACHINES—Multiple Spindle Adjustable
National Automatic Tool Co., Richmond, Ind.

DRILLING MACHINES—Multiple Spindle Horizontal
Baker Bros., Inc., Toledo, Ohio.
National Automatic Tool Co., Richmond, Ind.

DRILLING MACHINES—Portable Electric
Black & Decker Mfg. Co., The, Towson, Md.
Wodack Electric Tool Corp., Chicago.

DRILLING MACHINES—Portable Pneumatic
Cleveland (Ohio) Pneumatic Tool Co., The.
Helwig Mfg. Co., St. Paul, Minn.
Ingersoll-Rand Co., 11 Broadway, New York City.
Warner & Swasey Co., The, Cleveland.

DRILLING MACHINES—Radial
Cincinnati (Ohio) Bickford Tool Co., The.

DRILLING MACHINES—Sensitive
Leland-Gifford Co., Worcester, Mass.

DRILLING MACHINES—Upright
Baker Bros., Inc., Toledo, Ohio.
Cincinnati (Ohio) Bickford Tool Co., The.

DRILLING MACHINES—Vertical
Baker Bros., Inc., Toledo, Ohio.
Cincinnati (Ohio) Bickford Tool Co., The.

DRIVES—Gear
Farrel-Birmingham Co., Inc.,Buffalo,N.Y.
Mesta Mch. Co., Pittsburgh.

DRIVES—Single & Multiple V-Belts
Allis Chalmers Mfg. Co., Milwaukee.

DROP FORGINGS—See Forgings—Drop, Iron or Steel

DROP HAMMERS—See Hammers—Drop

DUST COLLECTORS
Abrasive Machine Tool Co., East Providence, R. I.
American Air Filter Co., Inc., Louisville, Ky.
American Blower Corp., 6000 Russell St., Detroit.
American Foundry Equipment Co., The, 401 Bykrit St., Mishawaka, Ind.
Blaw-Knox Co., Pittsburgh.
Pangborn Corporation, Hagerstown, Md.
Whiting Corp., Harvey, Ill.

ECONOMIZERS
Babcock & Wilcox Co., The, 85 Liberty St., New York City.

ELECTRIC HEATING ELEMENTS
Globar Div., The Carborundum Co., Niagara Falls, N. Y.

ELECTRIC LIGHTING—Industrial
General Electric Co., Cleveland.
General Electric Vapor Lamp Co., Hoboken, N. J.

ELECTRIC WELDING — See Welding — Electric

ELECTRICAL EQUIPMENT
Allis-Chalmers Mfg. Co., Milwaukee.
General Electric Co., Schenectady, N. Y.

ELECTRICAL MACHINERY — Second Hand. (See Clearing House Section)

ELECTRICAL WIRES
Roebling's, John A., Sons Co., Trenton, N. J.

ELECTRODE HOLDERS—Welding
Lincoln Electric Co., The, Cleveland.

ELECTRODES—Resistance Welding
Electroloy Co., Inc., 50 Church St., New York City.

ELECTRODES—Welding, Coated
Electric Arc Cutting & Welding Co., The, Newark, N. J.
Harnischfeger Corp., 4401 W. National Ave., Milwaukee.
Lincoln Electric Co., The, Cleveland.
Maurath, Inc., 7400 Union Ave., Cleveland.
Una Welding, Inc., Cleveland, Ohio.

ELECTROPLATING EQUIPMENT & SUPPLIES
Udylite Co., The, Detroit.

ELEVATORS—Portable
Barrett-Cravens Co., Chicago, Ill.
Lewis-Shepard Co., 122 Walnut St., Watertown Station, Boston.

ELEVATORS—Steam Hydraulic
Ridgway, Craig, & Son Co., Coatesville, Pa.

EMERY WHEELS—See Grinding Wheels

ENGINEERS & CONTRACTORS
Ferguson, H. K., Co., The, Cleveland.

ENGINEERS—Consulting and Industrial
Koppers Co., Pittsburgh.

ENGINES—Diesel
Ingersoll-Rand Co., 11 Broadway, N. Y. C.
Worthington Pump & Machinery Corp., Harrison, N. J.

ENGINES—Gas
Fairbanks, Morse & Co., Chicago.
Worthington Pump & Machinery Corp., Harrison, N. J.

ENGINES—Oil
Worthington Pump & Machinery Corp., Harrison, N. J.

EYELET MACHINES
Manville, E. J., Mch. Co., Waterbury, Ct.
Waterbury (Conn.) Farrel Foundry & Machine Co., The.

FACING CLAY
Carborundum Co., The, Perth Amboy, N.J.

FACTORY & PLANT SITES
Zoll, Edward H., 196 Market St., Newark, N. J.

FANS—Ventilating
American Blower Corp., 6000 Russell St., Detroit.
DeVilbiss Co., The, Toledo, Ohio.

FEED WATER HEATERS AND PURIFIERS
Harrisburg (Pa.) Steel Corp.

FEEDS—Hydraulic, for Machines
American Engineering Co., Philadelphia.
Oilgear Co., The, 1311 W. Bruce St., Milwaukee.

FELT—Wool Mechanical
American Felt Co.,315 Fourth Ave.,N.Y.C.

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FENCING—Wire
Pittsburgh (Pa.) Steel Co.

FERROALLOYS
Climax Molybdenum Co., 500 Fifth Ave., N. Y. C.
Electro Metallurgical Sales Corp., 30 E. 42nd St., N. Y. C.
Ohio Ferro-Alloys Corp., Canton, Ohio.
Pittsburgh Metallurgical Co., Inc., Niagara Falls, N. Y.
Titanium Alloy Mfg. Co., The, Niagara Falls, N. Y.
Vanadium Corp. of America, 420 Lexington Ave., N. Y. C.

FERROCHROME
Electro Metallurgical Sales Corp., 30 E. 42nd St., N. Y. C.
Ohio Ferro-Alloys Corp., Canton, Ohio.
Pittsburgh Metallurgical Co., Inc., Niagara Falls, N. Y.
Samuel, Frank, & Co., Inc., Philadelphia.
Vanadium Corp. of America, 420 Lexington Ave., N. Y. C.

FERROMANGANESE
Electro Metallurgical Sales Corp., 30 E. 42nd St., N. Y. C.
Ohio Ferro-Alloys Corp., Canton, Ohio.
Pittsburgh Metallurgical Co., Inc., Niagara Falls, N. Y.
Samuel, Frank & Co., Inc., Philadelphia.

FERROMOLYBDENUM
Climax Molybdenum Co., 500 Fifth Ave., N. Y. C.
Vanadium Corp. of America, 420 Lexington Ave., N. Y. C.

FERROSILICO MANGANESE
Ohio Ferro-Alloys Corp., Canton, Ohio.
Pittsburgh Metallurgical Co., Inc., Niagara Falls, N. Y.
Vanadium Corp. of America, 420 Lexington Ave., N. Y. C.

FERROSILICON
Electro Metallurgical Sales Corp., 30 E. 42nd St., N. Y. C.
Ohio Ferro-Alloys Corp., Canton, Ohio.
Pittsburgh Metallurgical Co., Inc., Niagara Falls, N. Y.
Samuel, Frank, & Co., Inc., Philadelphia.
Vanadium Corp. of America, 420 Lexington Ave., N. Y. C.

FERROSILICON ALUMINUM
Vanadium Corp. of America, 420 Lexington Ave., N. Y. C.

FERROSPIEGELEISEN
New Jersey Zinc Co., The, 160 Front St., N. Y. C.

FERROTITANIUM
Titanium Alloys Mfg. Co., The, Niagara Falls, N. Y.
Vanadium Corp. of America, 420 Lexington Ave., N. Y. C.

FERROVANADIUM
Electro Metallurgical Sales Corp., 30 E 42nd St., N. Y. C.
Vanadium Corp. of America, 420 Lexington Ave., N. Y. C.

FILES & RASPS
Disston, Henry, & Sons, Inc., Philadelphia.
Nicholson File Co., Providence, R. I.

FILING MACHINES
Continental Machine Specialties, Inc., Minneapolis, Minn.

FILTER CLOTH—Asbestos
Johns-Manville Corp., 22 East 40th St., New York City.

FILTERS—Air
American Air Filter Co., Inc., Louisville, Ky.

FILTERS—OIL
National Acme Co., The, Cleveland.

FILTERS—Pressure or Gravity
Scaife, Wm. B., & Sons Co., Pittsburgh.

FIRE BRICK—Insulating
Babcock & Wilcox Co., The, 85 Liberty St., New York City.
Quigley Co., Inc., 56 West 45th St., N. Y. C.

FIRE CLAY
Carborundum Co., The, Perth Amboy, N. J.
Illinois Clay Products Co., Joliet, Ill.
Keagler Brick Co., Steubenville, Ohio.
West Virginia Fire Clay Mfg. Co., Pittsburgh.

FITTINGS—Brass, Pipe and Tube
Commonwealth Brass Corp., Detroit.

FIXTURES—For Machine Tools
Knu-Vise Products Co., Detroit, Mich.

FLANGES—Forged Steel
Harrisburg (Pa.) Steel Corp.
Standard Steel Wks. Co., Burnham, Pa.

FLANGING WORK—Carbon and Alloy
Worth Steel Co., Claymont, Del.

FLEXIBLE SHAFT EQUIPMENT
Lovejoy Flexible Coupling Co., Chicago.
Strand, N. A., & Co., Chicago.

FLOODLIGHTS—Acetylene
Linde Air Products Company, The, 30 East 42nd St., N. Y. C.

FLOOR ARMORING
Acme Steel Co., Chicago, Ill.

FLOOR (CONCRETE) REPAIR MATERIALS
Flexrock Co., 892 N. Delaware Ave., Phila., Pa.

FLOOR PLATES—See Plates—Floor or Cellar Door

FLOORING—Acid Proof
Nukem Products Corp., 68 Niagara St., Buffalo, N. Y.

FLOORING—Monolithic
Johns-Manville Corp., 22 East 40th St., New York City.

FLOORING—Open Steel
Blaw-Knox Co., Pittsburgh.
Bravo Corp., Pittsburgh.
Hendrick Mfg. Co., Carbondale, Pa.

FLOORING—Steel
American Pressed Steel Co., Phila., Pa.

FLUX—Welding
Linde Air Products Company, The, 30 East 42nd St., N. Y. C.

FORGING MACHINES—Roll
Ajax Mfg. Co., The, Euclid, Ohio.

FORGING MACHINES—Upset
Acme Machinery Co., Cleveland.
Ajax Mfg. Co., The, Euclid, Ohio.

FORGINGS—Alloy Steel
National Forge & Ordnance Co., Irvine, Pa.

FORGINGS—Aluminum
Aluminum Co. of America, Pittsburgh.

FORGINGS—Brass, Bronze or Copper
American Brass Co., The, Waterbury, Conn.
Commonwealth Brass Corp., Detroit.
Revere Copper & Brass, Inc., 230 Park Ave., N. Y. C.
Transue & Williams Steel Forging Corp., Alliance, Ohio.

FORGINGS—Coin Pressed
Rockford (Ill.) Drop Forge Co.

FORGINGS—Drop, Iron or Steel
Atlas Drop Forge Co., Lansing, Mich.
Bay City Forge Co., Erie, Pa.
Billings & Spencer Co., Hartford, Conn.
Canton (Ohio) Drop Forging & Mfg. Co.
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Forging & Casting Corp., The, Ferndale, Mich.
Poor & Co., Canton Forge & Axle Wks., Canton, Ohio
Rockford (Ill.) Drop Forge Co.
Storms Drop Forging Co., Springfield, Mass.
Transue & Williams Steel Forging Corp., Alliance, Ohio.
Williams, J. H., & Co., Buffalo, N. Y.

FORGINGS—Hollow
Harrisburg (Pa.) Steel Corp.
National Forge & Ordnance Co., Irvine, Pa.

FORGINGS—Hollow Bored
American Hollow Boring Co., 1912 Raspberry St., Erie, Pa.

FORGINGS—Hydraulic Press, Iron or Steel
Atlas Drop Forge Co., Lansing, Mich.
Bethlehem (Pa.) Steel Company.
Mesta Mch. Co., Pittsburgh.
Midvale Co., The, Nicetown, Phila., Pa.
National Forge & Ordnance Co., Irvine, Pa.
Standard Steel Wks. Co., Burnham, Pa.

FORGINGS—Magnesium Alloys
Dow Chemical Co., The, 921 Jefferson Ave., Midland, Mich.

FORGINGS—Upset
Bethlehem (Pa.) Steel Company.
Lamson & Sessions Co., The, Cleveland.
Rockford (Ill.) Drop Forge Co.

FORMING AND COILING MACHINES
Peck, Stow & Wilcox Co., The, Southington, Conn.

FOUNDRY EQUIPMENT & SUPPLIES
Whiting Corp., Harvey, Ill.

FURNACE ENGINEERS
Electric Furnace Co., The, Salem, Ohio.
Flinn & Dreffein Co., Chicago.
Surface Combustion Corp., 2375 Dorr St., Toledo.
Wilson, Lee Engineering Co., The, Cleveland.

FURNACES—Annealing & Case Hardening
American Gas Furnace Co., Elizabeth, N. J.
Electric Furnace Co., The, Salem, Ohio.
Leeds & Northrup Co., Philadelphia.
Surface Combustion Corp., 2375 Dorr St., Toledo.
Wilson, Lee Engineering Co., The, Cleveland.

FURNACES—Billet or Ingot Heating
Flinn & Dreffein Co., Chicago.
Surface Combustion Corp., 2375 Dorr St., Toledo.

FURNACES—Brass Melting
Monarch Engineering & Mfg. Co., The, Baltimore, Md.

FURNACES—Electric, Steel Melting
American Bridge Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.
General Electric Co., Schenectady, N. Y.
Pittsburgh (Pa.) Lectromelt Furnace Corp.

FURNACES—Enameling
Carborundum Co., The, Perth Amboy, N. J.
Electric Furnace Co., The, Salem, Ohio.
Surface Combustion Corp., 2375 Dorr St., Toledo.

FURNACES—Forging
Electric Furnace Co., The, Salem, Ohio.
Holcroft & Co., Detroit.
Surface Combustion Corp., 2375 Dorr St., Toledo.
Wilson, Lee Engineering Co., The, Cleveland.

FURNACES—Heat Treating, Automatic
Amer. Gas Furnace Co., Elizabeth, N. J.
Electric Furnace Co., The, Salem, Ohio.
Holcroft & Co., Detroit.
Leeds & Northrup Co., Philadelphia.
Rockwell, W. S., Co., 50 Church St., N. Y. C.
Surface Combustion Corp., 2375 Dorr St., Toledo.

FURNACES—Heat Treating, Cyanide of Lead
Chicago (Ill.) Flexible Shaft Co.
Electric Furnace Co., The, Salem, Ohio.
Surface Combustion Corp., 2375 Dorr St., Toledo.

FURNACES—Heat Treating, Electric
Electric Furnace Co., The, Salem, Ohio.
General Electric Co., Schenectady, N. Y.
Holcroft & Co., Detroit.

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Hoskins Mfg. Co., Detroit, Mich.
Leeds & Northrup Co., Philadelphia.
Maehler, Paul Co., The, Chicago.
Rockwell, W. S., Co., 50 Church St., N.Y.C.
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

FURNACES—Heat Treating, Oil or Gas
Chicago (Ill.) Flexible Shaft Co.
Electric Furnace Co., The, Salem, Ohio.
Holcroft & Co., Detroit.
Maehler, Paul Co., The, Chicago.
Monarch Engineering & Mfg. Co., The, Baltimore, Md.
Rockwell, W. S., Co., 50 Church St., N.Y.C.
Surface Combustion Corp., 2375 Dorr St., Toledo.
Wilson, Lee Engineering Co., The, Cleveland.

FURNACES—Pack Heating Sheets
Aetna-Standard Engineering Co., The Youngstown, Ohio.
Wean Engineering Co., Inc., The, Warren, Ohio.

FURNACES—Rivet Heating, Electric
General Electric Co., Schenectady, N. Y.

FURNACES—Wire, Annealing and Galvanizing
General Electric Co., Schenectady, N. Y.
Surface Combustion Corp., 2375 Dorr St., Toledo.

GAGE BLOCKS
Ford Motor Co. (Johansson Division), Dearborn, Mich.
Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.

GAGES—Dial
Starrett, L. S., Co., Athol, Mass.

GAGES—Electric
Sheffield Gage Corp., Dayton, Ohio.

GAGES—Plug and Snap
Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.
Sheffield Gage Corp., Dayton, Ohio.
Taft-Peirce Mfg. Co., The, Woonsocket, R. I.

GAGES—Pressure & Vacuum Recording
Brown Instrument Co., The, Philadelphia, Pa.

GAGES—Temperature
Weston Electrical Instrument Corp., Newark, N. J.

GAGES—Thickness, for Rolling Mills
Haines Gauge Co., The, Phila., Pa.

GAGES—Thread Lead
Jones & Lamson Mch. Co., Springfield, Vt.
Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.
Sheffield Gage Corp., Dayton, Ohio.

GALVANIZING
Castle, Joseph P., & Bros., Phila.

GALVANIZING COMPOUNDS
Pennsylvania Salt Mfg. Co., Philadelphia, Pa.

GALVANIZING PLANTS—For Sheets
Aetna-Standard Engineering Co., The, Youngstown, Ohio.
Erie (Pa.) Foundry Co.

GAS ANALYSIS RECORDERS
Brown Instrument Co., The, Philadelphia, Pa.
Leeds & Northrup Co., Philadelphia.

GAS FOR INDUSTRIAL USES
American Gas Association, 420 Lexington Ave., N. Y. C.

GAS PRODUCERS
Flinn & Dreffein Co., Chicago.
Koppers Co., Pittsburgh.
Morgan Construction Co. Worcester, Mass.
Wood, R. D., & Co., Philadelphia.

GAS RECOVERY COKE OVENS
Koppers Co., Pittsburgh.

GASKETS—Asbestos, Metal or Rubber
Garlock Packing Co., The, Palmyra, N. Y.
Johns-Manville Corp., 22 East 40th St., New York City.

GASKETS—Rubber
Goodrich, B. F., Co., The, Akron, Ohio.

GEAR CUTTING
Earle Gear & Machine Co., Phila.
Farrel-Birmingham Co., Inc., Buffalo, N.Y.
Gleason Works, Rochester, N. Y.
James, D. O., Mfg. Co., Chicago.
Jones, W. A., Fdry. & Mch. Co., 4401 Roosevelt Rd., Chicago.
Philadelphia (Pa.) Gear Works.
Taylor-Wilson Mfg. Co. McKees Rocks, Pa.

GEAR CUTTING MACHINES
Farrel-Birmingham Co., Inc., Buffalo, N.Y.
Gleason Works, Rochester, N. Y.

GEAR DRIVES—Herringbone
Jones, W. A., Fdry. & Mch. Co., 4401 Roosevelt Rd., Chicago.
Lewis Foundry & Mch. Co., Pittsburgh.
United Engineering & Fdry. Co., Pitgh.

GEARMOTORS
Allis-Chalmers Mfg. Co., Milwaukee.
James, D. O., Mfg. Co., Chicago.
Reliance Electric & Engng. Co., Cleveland.
Westinghouse Elec. & Mfg. Co., East Pitgh.

GEAR PLANNING MACHINES
Gleason Works, Rochester, N. Y.

GEARS—Bevel
Boston Gear Wks., Inc., North Quincy, Mass.
Gleason Works, Rochester, N. Y.
James, D. O., Mfg. Co., Chicago.
Richardson Co., The, Melrose Park, Ill.

GEARS—Heat Treated
Gleason Works, Rochester, N. Y.
James, D. O., Mfg. Co., Chicago.
Jones, W. A., Fdry. & Mch. Co., 4401 Roosevelt Rd., Chicago.
Simonds Mfg. Co., Pittsburgh.

GEARS—Herringbone
Farrel-Birmingham Co., Inc., Buffalo, N.Y.
Horsburgh & Scott Co., 5112 Hamilton Ave., Cleveland.
James, D. O., Mfg. Co., Chicago.
Jones, W. A., Fdry. & Mch. Co., 4401 Roosevelt Rd., Chicago.
Mesta Mch. Co., Pittsburgh.
Philadelphia (Pa.) Gear Works.

GEARS—Machine Cut
Boston Gear Wks., Inc., North Quincy, Mass.
Cleveland (Ohio) Worm & Gear Co.
Gleason Works, Rochester, N. Y.
James, D. O., Mfg. Co., Chicago.
Jones, W. A., Fdry. & Mch. Co., 4401 Roosevelt Rd., Chicago.
Simonds Mfg. Co., Pittsburgh.

GEARS—Machine Molded
Poole Foundry & Mch. Co., Baltimore, Md.

GEARS—Non-Metallic
Boston Gear Wks., Inc., North Quincy, Mass.
Chicago (Ill.) Rawhide Mfg. Co., The, 1306 Elston Ave.
General Electric Co., Schenectady, N. Y.
James, D. O., Mfg. Co., Chicago.

GEARS—Rawhide
Chicago (Ill.) Rawhide Mfg. Co., The, 1306 Elston Ave.

GEARS—Steel, Silent
Waldron, John, Corp., New Brunswick, N. J.

GEARS—Spur
Boston Gear Wks., Inc., North Quincy, Mass.
James, D. O., Mfg. Co., Chicago.
Jones, W. A., Fdry. & Mch. Co., 4401 Roosevelt Rd., Chicago.
Philadelphia (Pa.) Gear Works.
Simonds Mfg. Co., Pittsburgh.

GEARS—Worm
Boston Gear Wks., Inc., North Quincy, Mass.
Cleveland (Ohio) Worm & Gear Co.
Horsburgh & Scott Co., 5112 Hamilton Ave., Cleveland.
James, D. O., Mfg. Co., Chicago.
Jones, W. A., Fdry. & Mch. Co., 4401 Roosevelt Rd., Chicago.
Philadelphia (Pa.) Gear Works.

GENERATORS—Acetylene
Air Reduction Sales Co., 60 East 42nd St., N. Y. C.
Linde Air Products Company, The, 30 East 42nd St., N. Y. C.

GENERATORS—Electric
Fairbanks, Morse & Co., Chicago.
Lincoln Electric Co., The, Cleveland.
Reliance Electric & Engng. Co., Cleveland.
Westinghouse Elec. & Mfg. Co., East Ptgh.

GENERATORS—Electric, Second Hand, (See Clearing House Section)

GLOVES—Asbestos & Fireproof
Safety Equipment Service Co., Cleveland.

GOGGLES—Safety
American Optical Co., Southbridge, Mass.
Safety Equipment Service Co., Cleveland.

GOVERNORS—Air Compressor
Westinghouse Air Brake Co., Industrial Div., Pittsburgh.

GRABS—For Sheets and Coils
J-B Engineering Sales Co., 1738 Orange St., New Haven, Conn.

GRATING—Flooring, Sidewalk, etc.—See Flooring—Open Steel

GREASE—Lubricating
Gulf Oil Corp., Gulf Refining Co., Pittsburgh.
Shell's Industrial Lubricants Div., Shell Bldg., San Francisco, Shell Bldg., St. Louis, & 50 W. 50th St., N. Y. C.
Socony-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.
Standard Oil Co. (Indiana), Chicago.
Sun Oil Co., Philadelphia.
Tide Water Associated Oil Co., 17 Battery Place, N. Y. C.

GRILLES—Metal Cane
Diamond Mfg. Co., Wyoming, Pa.

GRILLES—Perforated Metal
Erdle Perforating Co., Rochester, N. Y.
Harrington & King Perforated Co., Chicago.

GRINDING AND POLISHING MACHINES
Black & Decker Mfg. Co., The, Towson, Md.
Excelsior Tool & Mch. Co., E. St. Louis, Ill.
Norton Co., Worcester, Mass.
Production Machine Co., Greenfield, Mass.

GRINDING MACHINES—Belt
Production Machine Co., Greenfield, Mass.

GRINDING MACHINES—Broach
Thompson Grinder Co., Springfield, Ohio.

GRINDING MACHINES—Centerless
Cincinnati (Ohio) Grinders Incorporated.

GRINDING MACHINES—Cutter & Reamer
Cincinnati (Ohio) Milling Mch. Co., The.
Gallmeyer & Livingston Co., Grand Rapids, Mich.
Landis Tool Co., Waynesboro, Pa.

GRINDING MACHINES—Cylinder
Heald Mch. Co., Worcester, Mass.

GRINDING MACHINES—Cylindrical
Brown & Sharpe Mfg. Co., Providence, R.I.
Cincinnati (Ohio) Grinders Incorporated.
Landis Tool Co., Waynesboro, Pa.
Norton Co., Worcester, Mass.

GRINDING MACHINES—Die
Landis Mch. Co., Inc., Waynesboro, Pa.

GRINDING MACHINES—Drill
Gallmeyer & Livingston Co., Grand Rapids, Mich.

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INGOTS—Aluminum
Aluminum Co. of America, Pittsburgh.
Seligman, Arthur, & Co., Inc., 30 Rockefeller Plaza, R. C. A. Bldg., N. Y. C.

INGOTS—Phosphor Bronze
Phosphor Bronze Smelting Co., The, Phila.

INHIBITORS
American Chemical Paint Co., Ambler, Pa.
Du Pont de Nemours, E. I. & Co., Inc. Grasselli Chemicals Dept., Wilmington, Del.

INSTRUMENTS—Electric
Weston Electrical Instrument Corp., Newark, N. J.

INSTRUMENTS—Recording
Brown Instrument Co., The, Philadelphia, Pa.
Leeds & Northrup Co., Philadelphia.

INSULATION
Johns-Manville Corp., 22 East 40th St., New York City.

IRON—Rustless
Ludlum Steel Co., Watervliet, N. Y.

JIGS, FIXTURES, DIES, etc. (See Dies, Jigs, Fixtures, etc.)

KEYS—Riveted
Western Wire Prods. Co., St. Louis, Mo.

KEYSEATING MACHINES
Baker Bros., Inc., Toledo, Ohio.
Davis Keyseater Co., 460 Exchange St., Rochester, N. Y.

LACING—Belt, Rawhide or Leather
Chicago (Ill.) Rawhide Mfg. Co., The, 1306 Elston Ave.

LAGGING—Insulating
Quigley Co., Inc., 56 West 45th St., N. Y. C.

LAMPS—Filament
General Electric Co., Cleveland.

LAMPS—Mercury Vapor
General Electric Vapor Lamp Co., Hoboken, N. J.

LAPPING MACHINES
Cincinnati (Ohio) Grinders Incorporated.

LATHES—Automatic
Baird Mch. Co., The, Bridgeport, Conn.
Bullard Co., The, Bridgeport, Conn.
Gisholt Machine Co., Madison, Wis.
Goss & De Leeuw Mch. Co., New Britain, Conn.
Jones & Lamson Mch. Co., Springfield, Vt.
LeBlond, R. K., Mch. Tool Co., Cincinnatti.
Monarch Mch. Tool Co., The, Sidney, O.

LATHES—Automatic Vertical
Baird Mch. Co., The, Bridgeport, Conn.
Bullard Co., The, Bridgeport, Conn.
Gisholt Machine Co., Madison, Wis.

LATHES—Bench
Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.
Rivett Lathe & Grinder, Inc., Boston, Mass.
South Bend (Ind.) Lathe Works, 595 East Madison St.

LATHES—Brass
Warner & Swasey Co., The, Cleveland.

LATHES—Chucking
Jones & Lamson Mch. Co., Springfield, Vt.
Warner & Swasey Co., The, Cleveland.

LATHES—Contour Turning
Monarch Mch. Tool Co., The, Sidney, O.

LATHES—Crankshaft
LeBlond, R. K., Mch. Tool Co., Cincinnati.

LATHES—Engine
Hill-Clarke Mchry. Co., 647 W. Washington Blvd., Chicago.
LeBlond, R. K., Mch. Tool Co., Cincinnati.
Monarch Mch. Tool Co., The, Sidney, O.
Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.
South Bend (Ind.) Lathe Works, 595 East Madison St.

LATHES—Roll
Lewis Foundry & Mch. Co., Pittsburgh.
Mesta Mch. Co., Pittsburgh.
United Engineering & Fdry. Co., Pitgh.

LATHES — Second-Hand. (See Clearing House Section)

LATHES—Toolroom
LeBlond, R. K., Machine Tool Co., Cincinnati, Ohio.
Monarch Mch. Tool Co., The, Sidney, O.
Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.
South Bend (Ind.) Lathe Works, 595 East Madison St.

LATHES—Turret
Acme Machine Tool Co., Cincinnati.
Bardons & Oliver, Cleveland.
Bullard Co., The, Bridgeport, Conn.
Gisholt Machine Co., Madison, Wis.
Jones & Lamson Mch. Co., Springfield, Vt.
Warner & Swasey Co., The, Cleveland.

LATHES, Turret, Vertical
Bullard Co., The, Bridgeport, Conn.
Rogers Machine Wks., Alfred, New York.

LAYOUT FLUID
Dayton Rogers Mfg. Co., Minneapolis, Minn.

LEAD LININGS
Dietzel Lead Burning Co., Pittsburgh.
National Lead Co., 111 Bdway., N. Y. C.

LEAD—In Oil
National Lead Co., 111 Bdway., N. Y. C.

LEAD—Tellurium
National Lead Co., 111 Bdway., N. Y. C.

LEATHER—Cup
Chicago (Ill.) Rawhide Mfg. Co., The, 1306 Elston Ave.

LEGGINS—Safety
Safety Equipment Service Co., Cleveland.

LEVELING MACHINES
Aetna-Standard Engineering Co., The, Youngstown, Ohio.
Schatz Mfg. Co., The, Poughkeepsie, N. Y.
Wean Engineering Co., Inc., The, Warren, O.

LINING—Converter
Edge Hill Silica Rock Co., New Brunswick, New Jersey.

LOCK WASHER MACHINERY
Sleeper & Hartley, Inc., Worcester, Mass.

LOCOMOTIVES—Electric
Atlas Car & Mfg. Co., The, Cleveland.
Davenport (Iowa) Locomotives Works.
General Electric Co., Schenectady, N. Y.

LOCOMOTIVES—Gas-Electric
Davenport (Iowa) Locomotives Works.

LOCOMOTIVES—Industrial
Davenport (Iowa) Locomotives Works.

LOCOMOTIVES—Steam
Iron & Steel Products, Inc., Chicago.

LOCOMOTIVES—Storage Battery
Atlas Car & Mfg. Co., The, Cleveland.

LUBRICANTS—Crusher & Grinding
Gulf Oil Corp., Gulf Refining Co., Pittsburgh.
Shell's Industrial Lubricants Div., Shell Bldg., San Francisco, Shell Bldg., St. Louis, & 50 W. 50th St., N. Y. C.
Socony-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.
Sun Oil Co., Philadelphia.
Texas Company, The, 135 East 42nd St., N. Y. C.
Tide Water Associated Oil Co., 17 Battery Place, N. Y. C.

LUBRICANTS—Gear
Gulf Oil Corp., Gulf Refining Co., Pittsburgh.
Shell's Industrial Lubricants Div., Shell Bldg., San Francisco, Shell Bldg., St. Louis, & 50 W. 50th St., N. Y. C.
Socony-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.
Standard Oil Co. (Indiana), Chicago.
Sun Oil Co., Philadelphia.
Texas Company, The, 135 East 42nd St., N. Y. C.
Tide Water Associated Oil Co., 17 Battery Place, N. Y. C.

LUBRICANTS—High Pressure & Temperature
Gulf Oil Corp., Gulf Refining Co., Pittsburgh.
Shell's Industrial Lubricants Div., Shell Bldg., San Francisco, Shell Bldg., St. Louis, & 50 W. 50th St., N. Y. C.
Socony-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.
Standard Oil Co. (Indiana), Chicago.
Sun Oil Co., Philadelphia.
Texas Company, The, 135 East 42nd St., N. Y. C.
Tide Water Associated Oil Co., 17 Battery Place, N. Y. C.

LUBRICANTS—Mine Cars
Gulf Oil Corp., Gulf Refining Co., Pittsburgh.
Shell's Industrial Lubricants Div., Shell Bldg., San Francisco, Shell Bldg., St. Louis, & 50 W. 50th St., N. Y. C.
Socony-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.
Sun Oil Co., Philadelphia.
Texas Company, The, 135 East 42nd St., N. Y. C.
Tide Water Associated Oil Co., 17 Battery Place, N. Y. C.

LUBRICANTS—Mining Machines
Gulf Oil Corp., Gulf Refining Co., Pittsburgh.
Shell's Industrial Lubricants Div., Shell Bldg., San Francisco, Shell Bldg., St. Louis, & 50 W. 50th St., N. Y. C.
Socony-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.
Sun Oil Co., Philadelphia.
Texas Company, The, 135 East 42nd St., N. Y. C.
Tide Water Associated Oil Co., 17 Battery Place, N. Y. C.

LUBRICANTS—Railroad
Gulf Oil Corp., Gulf Refining Co., Pittsburgh.
Shell's Industrial Lubricants Div., Shell Bldg., San Francisco, Shell Bldg., St. Louis, & 50 W. 50th St., N. Y. C.
Socony-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.
Sun Oil Co., Philadelphia.
Texas Company, The, 135 East 42nd St., N. Y. C.
Tide Water Associated Oil Co., 17 Battery Place, N. Y. C.

LUBRICANTS—Roll Neck—Anti-Friction & Plain
Gulf Oil Corp., Gulf Refining Co., Pittsburgh.
Shell's Industrial Lubricants Div., Shell Bldg., San Francisco, Shell Bldg., St. Louis, & 50 W. 50th St., N. Y. C.
Socony-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.
Standard Oil Co. (Indiana), Chicago.
Sun Oil Co., Philadelphia.
Tide Water Associated Oil Co., 17 Battery Place, N. Y. C.

LUBRICANTS—Tipple & Cleaning
Gulf Oil Corp., Gulf Refining Co., Pittsburgh.
Shell's Industrial Lubricants Div., Shell Bldg., San Francisco; Shell Bldg., St. Louis, and 50 W. 50th St., N. Y. C.
Socony-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.
Sun Oil Co., Philadelphia.
Texas Company, The, 135 East 42nd St., N. Y. C.
Tide Water Associated Oil Co., 17 Battery Place, N. Y. C.

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MACHINE GUARD MATERIALS
Erdle Perforating Co., Rochester, N. Y.

MACHINE WORK
General Machine Works, York, Pa.
Gifford-Wood Co., Hudson, N. Y.
Houde Engineering Corp., Buffalo, N. Y.
Taft-Peirce Mfg. Co., The, Woonsocket, R. I.

MACHINERY DEALERS — Second-Hand, (See Clearing House Section)

MACHINISTS' SMALL TOOLS
Brown & Sharpe Mfg. Co., Providence, R. I.
Starrett, L. S., Co., Athol, Mass.

MAGNESITE—Brick or Dead Burnt
Carborundum Co., The, Perth Amboy, N. J.

MAGNESIUM
Dow Chemical Co., The, 921 Jefferson Ave., Midland, Mich.

MAGNETS—Lifting
Cutler-Hammer, Inc., Milwaukee.
Electric Controller & Mfg. Co., The, Cleve.
Ohio Electric Mfg. Co., The, 5908 Maurice Ave., Cleveland.

MALLETS—Rawhide
Chicago (Ill.) Rawhide Mfg. Co., The, 1306 Elston Ave.

MANDRELS—Expanding
Nicholson, W. H., & Co., 165 Oregon St., Wilkes-Barre, Pa.

MANGANESE METAL AND ALLOYS
Electro Metallurgical Sales Corp., 30 East 42nd St., N. Y. C.

MANHOLE FITTINGS AND SADDLES
Worth Steel Co., Claymont, Del.

MANIFOLDS—Oxygen & Acetylene
Air Reduction Sales Co., 60 East 42nd St., N. Y. C.
Linde Air Products Company, The, 30 East 42nd St., N. Y. C.

MARKING MACHINES
Noble & Westbrook Mfg. Co., The, East Hartford, Conn.

METAL SPECIALTIES
Crosby Co., The, Buffalo, N. Y.
Grammes, L. F., & Sons, Inc., Allentown, Pa.
Toledo (Ohio) Stamping & Mfg. Co.
Torrington (Conn.) Company.
Truscon Steel Co., Pressed Steel Div., Cleveland.
Whitehead Stamping Co., 1669 W. Lafayette Blvd., Detroit, Mich.
Worcester (Mass.) Stamped Metal Co.

METAL—Thermostatic Bimetal
Chace, W. M., Co., 1605 Beard Ave., Detroit.

METALS—Coating
Metals Coating Co. of America, Phila., Pa.

METERS—Electric Welding
Lincoln Electric Co., The, Cleveland.

METERS—Flow
Brown Instrument Co., The, Philadelphia, Pa.
Leeds & Northrup Co., Philadelphia.

METERS—Water & Oil
Worthington Pump & Machinery Corp., Harrison, N. J.

MICA SCHIST
Edge Hill Silica Rock Co., New Brunswick, New Jersey.

MICROMETERS
Starrett, L. S., Co., Athol, Mass.

MICROMETERS—Automatic, for Rolling Mills
Haines Gauge Co., The, Phila., Pa.

MILLING MACHINES—Automatic
Cincinnati (Ohio) Milling Mch. Co., The.

MILLING MACHINES—Horizontal
Brown & Sharpe Mfg. Co., Prov., R. I.
Cincinnati (Ohio) Milling Mch. Co., The.

MILLING MACHINES—Planer Type
Cincinnati (Ohio) Planer Co.

MILLING MACHINES — Second - Hand, (See Clearing House Section)

MILLING MACHINES—Vertical
Brown & Sharpe Mfg. Co., Prov., R. I.
Cincinnati (Ohio) Milling Mch. Co., The.

MOLDING MACHINES
Tabor Mfg. Co., Phila., Pa.

MOLYBDENUM
Climax Molybdenum Co., 500 Fifth Ave., N. Y. C.

MONEL METAL
International Nickel Co., Inc., The, 67 Wall St., N. Y. C.

MONORAIL SYSTEMS—Hand & Electric
American Monorail Co., The, Cleveland.
Cleveland Tramrail Div. of The Cleveland Crane & Engng. Co., Wickliffe, Ohio.

MOTORS—Electric
Allis-Chalmers Mfg. Co., Milwaukee.
Century Electric Co., St. Louis, Mo.
Fairbanks, Morse & Co., Chicago.
General Electric Co., Schenectady, N. Y.
Harnischfeger Corp., 4401 W. National Ave., Milwaukee.
Lincoln Electric Co., Cleveland.
Reliance Electric & Engineering Co., Cleveland.
Westinghouse Elec. & Mfg. Co., E. Ptgh.

MOTORS—Electric, Second-Hand. (See Clearing House Section)

MUFFLES—Alloy
Electro Alloys Co., Elyria, Ohio.

NAILS—Wire
American Steel & Wire Co. (U. S. Steel Corp. Subsidiary), Chicago.
Columbia Steel Co. (U. S. Steel Corp. Subsidiary), San Francisco, Calif.
Hassall, John, Inc., Clay & Oakland Sts., Bklyn., N. Y.
Pittsburgh (Pa.) Steel Co.
Wickwire Brothers, Cortland, N. Y.
Youngstown (Ohio) Sheet & Tube Co., The.

NIBBLING MACHINES
Gray Machine Co., Philadelphia.

NICKEL
International Nickel Co., Inc., The, 67 Wall St., N. Y. C.

NICKEL ANODES—Rolled or Cast
Seymour (Conn.) Mfg. Co.

NICKEL SILVER
Seymour (Conn.) Mfg. Co.

NITROGEN
Air Reduction Sales Co., 60 East 42nd St., N. Y. C.

NOZZLES—Sand Blasting
Norton Co., Worcester, Mass.

NUMBERING MACHINES—For Metal
Noble & Westbrook Mfg. Co., The, East Hartford, Ct.

NUT MACHINERY — Automatic Cold Pressed
Waterbury (Conn.) Farrel Foundry & Machine Co., The.

NUTS—Acorn
Republic Steel Corp., Upson Nut Div., Cleveland, O.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.

NUTS—Castellated
National Acme Co., The, Cleveland.
Republic Steel Corp., Upson Nut Div., Cleveland, O.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.

NUTS—Cold Punched
Republic Steel Corp., Upson Nut Div., Cleveland, O.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.

NUTS—Hot Pressed
Republic Steel Corp., Upson Nut Div., Cleveland, O.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.

NUTS—Lock
Standard Pressed Steel Co., Jenkintown, Pa.

NUTS—Machine Screw
Blake & Johnson Co., The, Waterville, Ct.

NUTS—Semi-Finished
Cleveland (Ohio) Cap Screw Co., The.
Republic Steel Corp., Upson Nut Div., Cleveland, O.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.

NUTS—Thumb Malleable
Republic Steel Corp., Upson Nut Div., Cleveland, O.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.

NUTS—Wing
Parker-Kalon Corp., 196 Varick St., N. Y. C.

OIL & GREASE SEALS
Chicago (Ill.) Rawhide Mfg. Co., The, 1306 Elston Ave.

OIL RETAINERS
Chicago (Ill.) Rawhide Mfg. Co., The, 1306 Elston Ave.

OIL STONES
Carborundum Co., The, Niagara Falls, N. Y.
Norton Co., Worcester, Mass.

OILS—Cutting
Shell's Industrial Lubricants Div., Shell Bldg., San Francisco, Shell Bldg., St. Louis, & 50 W. 50th St., N. Y. C.
Socony-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.
Standard Oil Co. (Indiana), Chicago, Ill.
Sun Oil Co., Philadelphia.
Tide Water Associated Oil Co., 17 Battery Place, N. Y. C.

OILS—Fuel
Gulf Oil Corp., Gulf Refining Co., Pittsburgh.
Socony-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.
Standard Oil Co. (Indiana), Chicago, Ill.
Sun Oil Co., Philadelphia.
Tide Water Associated Oil Co., 17 Battery Place, N. Y. C.

OILS—Lubricating
Gulf Oil Corp., Gulf Refining Co., Pittsburgh.
Shell's Industrial Lubricants Div., Shell Bldg., San Francisco, Shell Bldg., St. Louis, & 50 W. 50th St., N. Y. C.
Socony-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.
Standard Oil Co. (Indiana), Chicago.
Texas Company, The, 135 East 42nd St. N. Y. C.
Tide Water Associated Oil Co., 17 Battery Place, N. Y. C.

OILS—Soluble—See Oils—Cutting

ORES—Iron
Cleveland-Cliffs Iron Co., The, Cleveland, Ohio.
Hanna Furnace Corp., The, Detroit, Mich.
Pickands Mather & Co., Cleveland.
Shenango Furnace Co., Pittsburgh.
Snyder, W. P., & Co., Pittsburgh.

OVENS—Coke and By-Product Recovery
Koppers Co., Pittsburgh.

OVENS—Core and Mold
Herrington & Randall, Inc., Detroit.
Holcroft & Co., Detroit.
Monarch Engineering & Mfg. Co., The, Baltimore, Md.

OVENS—Cross Regenerative
Koppers Co., Pittsburgh.

Products Index

OVENS—Enameling and Japanning
Carborundum Co., The, Perth Amboy, N. J.
Herrington & Randall, Inc., Detroit.
Maehler, Paul Co., The, Chicago.
Surface Combustion Corp., 2375 Dorr St., Toledo.

OXY-ACETYLENE — Shape-Cutting Machines
Air Reduction Sales Co., 60 East 42nd St., N. Y. C.
Linde Air Products Company, The, 30 East 42nd St., N. Y. C.

OXYGEN
Air Reduction Sales Co., 60 East 42nd St., N. Y. C.
Linde Air Products Company, The, 30 East 42nd St., N. Y. C.

PACKING—Felt
American Felt Co., 315 Fourth Ave., N. Y. C.

PACKING—Hydraulic
Rhoads, J. E. & Sons, Philadelphia.

PACKING—Leather
Chicago (Ill.) Rawhide Mfg. Co., The, 1306 Elston Ave.
Rhoads, J. E., & Sons, Philadelphia.

PACKING—Metallic
Garlock Packing Co., The, Palmyra, N. Y.

PACKING—Rubber
Goodrich, B. F., Co., The, Akron, Ohio.
Goodyear Tire & Rubber Co., Akron, Ohio.
Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., The, 2 Townsend St., Passaic, N. J.

PACKING—Sheet, Asbestos or Rubber
Garlock Packing Co., The, Palmyra, N. Y.
Johns-Manville Corp., 22 East 40th St., New York City.

PAINT
Midland Paint & Varnish Co., The, Cleveland.
National Lead Co., 111 Bdway., N. Y. C.

PAINT STICKS
Helmer & Staley, Inc., Chicago, Ill.

PERFORATED METAL
Chicago Perforating Co., 2440 W 24th Place, Chicago, Ill.
Diamond Mfg. Co., Wyoming, Pa.
Erdle Perforating Co., Rochester, N. Y.
Harrington & King Perforating Co., Chicago.
Hendrick Mfg. Co., Carbondale, Pa.
Mundt, Chas., & Sons, 59 Fairmount Ave., Jersey City, N. J.
Wickwire Spencer Steel Co., 41 East 42nd St., N. Y. C.

PHOSPHOR—Copper
Phosphor Bronze Smelting Co., The, Phila.

PICKLING COMPOUNDS
American Chemical Paint Co., Ambler, Pa.

PICKLING MACHINES
Aetna-Standard Engineering Co., The, Youngstown, Ohio.
Mesta Mch. Co., Pittsburgh.

PICKLING TANK LININGS
Cellcote Co., The, Cleveland.
Keagler Brick Co., Steubenville, Ohio.
National Lead Co., 111 Bdway., N. Y. C.

PICKLING TANK STEAM JETS
Dietzel Lead Burning Co., Pittsburgh.
Durion Co., Inc., The, 438 N. Findlay St., Dayton, Ohio.

PIG IRON
Bethlehem (Pa.) Steel Co.
Brooke, E. & G., Iron Co., Birdsboro, Pa.
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Cleveland-Cliffs Iron Co., The, Cleveland, Ohio.
Hanna Furnace Corp., The, Detroit, Mich.
Pickands Mather & Co., Cleveland.
Republic Steel Corp., Cleveland, Ohio.
Shenango Furnace Co., Pittsburgh.
Shenango-Penn Mold Co., Pittsburgh.
Superior Charcoal Iron Co., Grand Rapids, Mich.
Tennessee Coal, Iron & Railroad Co. (U. S. Steel Corp. Subsidiary), Birmingham, Ala.

PIG IRON—Charcoal
Superior Charcoal Iron Co., Grand Rapids, Mich.

PILING—Steel Pipe
National Tube Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.

PILING—Steel Sheet
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Jones & Laughlin Steel Corp., Pittsburgh.

PINIONS—Rolling Mill
Mesta Mch. Co., Pittsburgh.

PINIONS—Wire and Rod
Rathbone, A. R. & J., Palmer, Mass.

PINS—Cotter
Lamson & Sessions Co., The, Cleveland.

PIPE—Acid Resisting
Haveg Corporation, Newark, Delaware.

PIPE—Cast Iron, B. & S. and Flanged
Wood, R. D., & Co., Philadelphia.

PIPE—Hammer Welded
National Tube Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.

PIPE—Lead
National Lead Co., 111 Bdway., N. Y. C.

PIPE—Lead Lined
National Lead Co., 111 Bdway., N. Y. C.

PIPE—New and Second-Hand
Albert & Davidson Pipe Corp., 2nd Ave., 50-51st St., Bklyn., N. Y.
Albert Pipe Supply Co., Inc., Berry and N. 13th St., Bklyn., N. Y.
Greenpoint Iron & Pipe Co., Inc., Stagg & Bogart Sts., Bklyn., N. Y.

PIPE—Seamless Brass or Copper
American Brass Co., The, Waterbury, Conn.
Revere Copper & Brass, Inc., 230 Park Ave., N. Y. C.

PIPE—Spiral Welded
American Rolling Mill Co., Middletown, O.
Crane Co., Chicago.

PIPE—Standard, Black and Galvanized
Bethlehem (Pa.) Steel Co.
Jones & Laughlin Steel Corp., Pittsburgh.
National Tube Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.
Republic Steel Corp., Cleveland, Ohio.
Youngstown (Ohio) Sheet & Tube Co., The.

PIPE—Welded, Electric
National Tube Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.
Republic Steel Corp., Cleveland, Ohio.

PIPE COVERING—Asbestos
Johns-Manville Corp., 22 East 40th St., New York City.

PIPE FITTINGS
Crane Co., Chicago.
Jarecki Mfg. Co., Erie, Pa.

PIPE THREADING & CUTTING MACHINES
Aetna-Standard Engineering Co., The, Youngstown, Ohio.
Jarecki Mfg. Co., Erie, Pa.
Landis, Mach. Co., Inc., Waynesboro, Pa.
Merrell Mfg. Co., Toledo.
Murchey Machine & Tool Co., Detroit.
Taylor-Wilson Mfg. Co., McKees Rocks, Pa.

PLANERS
Cincinnati (Ohio) Planer Co.

PLANING MACHINES — Second Hand. (See Clearing House Section)

PLASTICS—Laminated
Bakelite Corp., 247 Park Ave., N. Y. C.

PLASTICS — Laminated or Molded Phenolic
Richardson Co., The, Melrose Park, Ill.

PLASTICS—Molded
Bakelite Corp., 247 Park Ave., N. Y. C.

PLASTICS—Synthetic
Bakelite Corp., 247 Park Ave., N. Y. C.

PLATER'S CLEANING COMPOUND
American Chemical Paint Co., Ambler, Pa.

PLATES—Floor or Cellar Door
Alan Wood Steel Co., Conshohocken, Pa.
American Pressed Steel Co., Phila., Pa.
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Central Iron & Steel Co., Harrisburg, Pa.
Inland Steel Co., Chicago.

PLATES—Iron or Steel
Alan Wood Steel Co., Conshohocken, Pa.
American Pressed Steel Co., Phila., Pa.
American Rolling Mill Co., Middletown, O.
Bethlehem (Pa.) Steel Company.
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Central Iron & Steel Co., Harrisburg, Pa.
Granite City (Ill.) Steel Co.
Inland Steel Co., Chicago.
Jones & Laughlin Steel Corp., Pittsburgh.
Ryerson, Joseph T., & Son, Inc., Chicago.
Tennessee Coal, Iron & Railroad Co. (U. S. Steel Corp. Subsidiary), Birmingham, Ala.
Weirton (W. Va.) Steel Co.
Worth Steel Co., Claymont, Del.
Youngstown (Ohio) Sheet & Tube Co., The.

PLATFORMS—Skid
Lewis-Shepard Co., 122 Walnut St., Watertown Station, Boston.

PLUGS—Core Hole
Hubbard, M. D., Spring Co., 750 Central Ave., Pontiac, Mich.

POLISHING & BUFFING MACHINES—Automatic
Packer Machine Co., The, Meriden, Conn.

POLISHING MACHINES
Continental Machine Specialties, Inc., Minneapolis, Minn.
Packer Machine Co., The, Meriden, Conn.

POLISHING MACHINES—Bar
Medart Co., The, St. Louis, Mo.

POLISHING MACHINES—Belt
Production Machine Co., Greenfield, Mass.

POTS—Lead, Cyanide or Carbon
Electro Alloys Co., Elyria, Ohio.

POWER UNITS—Rotary
Cushman Chuck Co., Hartford, Conn.
New Departure Div., General Motors Corp., Bristol, Conn.

POWER UNITS—Straight Line
Cushman Chuck Co., Hartford, Conn.

PRECIPITATORS—Electrostatic Dust
Pangborn Corporation, Hagerstown, Md.

PRESS FEEDS—Automatic
Littell, F. J., Mch. Co., Chicago.

PRESSED METAL PARTS
Champion Sheet Metal Co., Inc., cor. Squires & Duane Sts., Cortland, N. Y.
Crosby Co., The, Buffalo, N. Y.
Stanley Works, The, New Britain, Conn.; Bridgeport, Conn.
Transue & Williams Steel Forging Corp., Alliance, Ohio.
Whitehead Stamping Co., 1669 W. Lafayette Blvd., Detroit, Mich.

PRESSED STEEL PARTS
Crosby Co., The, Buffalo, N. Y.
Lansing (Mich.) Stamping Co., So. Penn Ave.
Parish Pressed Steel Co., Reading, Pa.
Toledo (Ohio) Stamping & Mfg. Co.
Transue & Williams Steel Forging Corp., Alliance, Ohio.
Truscon Steel Co., Pressed Steel Div., Cleveland.

PRESSES—Automatic
Henry & Wright Mfg. Co., The, Hartford, Conn.
Niagara Mch. & Tool Wks., Buffalo, N. Y.
V & O Press Co., Hudson, N. Y.

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RODS—Rustless
Rustless Iron & Steel Corp., Baltimore, Md.

RODS—Welding
Air Reduction Sales Co., 60 East 42nd St., N. Y. C.
American Brass Co., The, Waterbury, Conn.
American Steel & Wire Co. (U. S. Steel Corp. Subsidiary), Chicago.
Electric Arc Cutting & Welding Co., The, Newark, N. J.
Harnischfeger Corp., 4401 W. National Ave., Milwaukee.
Lincoln Electric Co., The, Cleveland.
Linde Air Products Company, The, 30 East 42nd St., N. Y. C.
Pittsburgh (Pa.) Steel Co.
Revere Copper & Brass, Inc., 230 Park Ave., N. Y. C.
Una Welding, Inc., Cleveland, Ohio.
Wilson Welder & Metals Co., Inc., 60 E. 42nd St., New York City.

RODS—Wire
American Steel & Wire Co. (U. S. Steel Corp. Subsidiary), Chicago.
Bethlehem (Pa.) Steel Co.
Jones & Laughlin Steel Corp., Pittsburgh.
Pittsburgh (Pa.) Steel Co.
Wickwire Brothers, Cortland, N. Y.
Wickwire Spencer Steel Co., 41 East 42nd St., N. Y. C.
Youngstown (Ohio) Sheet & Tube Co., The.

ROLLING MACHINERY—Cold Rolling
Cold Metal Process Co., The, Youngstown, Ohio.
Lewis Foundry & Mch. Co., Pittsburgh.
United Engineering & Fdry. Co., Pgh.

ROLLING MACHINERY—Sheet Metal
Lewis Foundry & Mch. Co., Pittsburgh.

ROLLING MILL MACHINERY
Aetna-Standard Engineering Co., The, Youngstown, Ohio.
Birdsboro (Pa.) Steel Foundry & Machine Co.
Cold Metal Process Co., The, Youngstown, Ohio.
Farrel-Birmingham Co., Inc., Ansonia, Ct.
Hyde Park (Pa.) Fdry. & Mch. Co.
Lewis Foundry & Mch. Co., Pittsburgh.
Mesta Mch. Co., Pittsburgh.
Morgan Construction Co., Worcester, Mass.
Morgan Engineering Co., The, Alliance, O.
National Roll & Fdry. Co., Avonmore, Pa.
Standard Machinery Co., Providence, R. I.
United Engineering & Fdry. Co., Pgh.
Waterbury (Ct.) Farrel Fdry. & Mch. Co. The.

ROLLING MILLS—Copper Rod & Sheet
Torrington (Conn.) Mfg. Co., The.

ROLLS—Alloy Steel
Pittsburgh (Pa.) Rolls Corp.

ROLLS—Bending and Straightening
Baldwin-Southwark Corp., Southwark Div., Philadelphia.
Bertsch & Co., Cambridge City, Ind.
Lake Erie Engineering Corp., 68 Kenmore Sta., Buffalo, N. Y.
Niagara Machine & Tool Works, Buffalo, N. Y.
Schatz Mfg. Co., The, Poughkeepsie, N. Y.

ROLLS—Rubber Covered
Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., The, 2 Townsend St., Passaic, N. J.

ROLLS—Sand Chilled Iron and Steel
Aetna-Standard Engineering Co., The Youngstown, Ohio.
Birdsboro (Pa.) Steel Foundry & Machine Co.
Hyde Park (Pa.) Fdry. & Mch. Co.
Lewis Foundry & Mch. Co., Pittsburgh.
Mackintosh-Hemphill Co., Pittsburgh.
Mesta Mch. Co., Pittsburgh.
National Roll & Fdry. Co., Avonmore, Pa.
Pittsburgh (Pa.) Rolls Corp.
United Engineering & Fdry. Co., Pgh.

ROLLS—Special Hardened
Midvale Co., The Nicetown, Phila., Pa.

ROOFING—Special Copper Bearing Steel
Superior Sheet Steel Co., Canton, Ohio.

ROOFING AND SIDING—Corrugated and Plain
American Rolling Mill Co., Middletown, O.
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Johns-Manville Corp., 22 East 40th St., New York City.
Weirton (W. Va.) Steel Co.
Youngstown (Ohio) Sheet & Tube Co., The.

ROOFING AND SIDING—Iron and Steel
Inland Steel Co., Chicago.

ROOFING & SIDING—(Zinc)—Corrugated & Plain
New Jersey Zinc Co., The, 160 Front St., N. Y. C.

RUBBER LININGS
Goodrich, B. F. Co., The, Akron, Ohio.
Goodyear Tire & Rubber Co., Akron, Ohio.

RUBBER MOLDED PARTS
Goodyear Tire & Rubber Co., Akron, Ohio.
Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., The, 2 Townsend St., Passaic, N. J.
Richardson Co., The, Melrose Park, Ill.

RUST PREVENTIVES
American Chemical Paint Co., Ambler, Pa.
American Lanolin Corp., Lawrence, Mass.
Midland Paint & Varnish Co., The, Cleveland.
Parker Rust-Proof Co., 2186 Milwaukee Ave., Detroit.

RUST PROOFING COMPOUNDS
Parker Rust-Proof Co., 2186 Milwaukee Ave., Detroit.

RUST PROOFING PROCESS
American Chemical Paint Co., Ambler, Pa.
Parker Rust-Proof Co., 2186 Milwaukee Ave., Detroit.
Udylite Co., The, Detroit.

SAND BLAST EQUIPMENT AND MACHINES
American Foundry Equipment Co., The, 401 Byrkit St., Mishawaka, Ind.
Panghorn Corporation, Hagerstown, Md.

SAND BLAST STEEL SHOT
American Foundry Equipment Co., The, 401 Byrkit St., Mishawaka, Ind.
Pittsburgh (Pa.) Crushed Steel Co.

SAND HANDLING EQUIPMENT
Bartlett, C. O.-Snow Co., The, Cleveland.

SAWING MACHINES—Metal
Espen-Lucas Mch. Works, Phila.
Peerless Mch. Co., Racine, Wis.
Tannewitz Works, The, Grand Rapids, Mich.

SAWING MACHINES—Metal-Band
Continental Machine Specialties, Inc., Minneapolis, Minn.
Tannewitz Works, The, Grand Rapids, Mich.

SAWS—Band and Hack for Metal
Armstrong-Blum Mfg. Co., Chicago.
Atkins, E. C., & Co., Indianapolis.
Disston, Henry, & Sons, Inc., Philadelphia.
Tannewitz Works, The, Grand Rapids, Mich.
Wells Mfg. Corp., Three Rivers, Mich.

SAWS—Circular, Rip & Cutoff
Atkins, E. C., & Co., Indianapolis.

SAWS—Friction
Atkins, E. C., & Co., Indianapolis.
Disston, Henry, & Sons, Inc., Philadelphia.

SAWS—Hack Saw Blades
Atkins, E. C., & Co., Indianapolis.
Peerless Mch. Co., Racine, Wis.
Starrett, L. S., Co., Athol, Mass.

SAWS—Hot Metal
Atkins, E. C., & Co., Indianapolis.
Disston, Henry, & Sons, Inc., Philadelphia.

SAWS—Inserted Tooth, Cold
Disston, Henry, & Sons, Inc., Philadelphia.
Tabor Mfg. Co., Philadelphia.

SAWS—Milling
Atkins, E. C., & Co., Indianapolis.
Disston, Henry, & Sons, Inc., Philadelphia.

SAWS—Portable Electric
Black & Decker Mfg. Co., The, Towson, Md.

SCALES
Exact Weight Scale Co., Columbus, Ohio.
Fairbanks, Morse & Co., Chicago.
Streeter-Amet Co., Chicago.

SCREENS—Perforated Metal
Chicago Perforating Co., 2440 W. 24th Place, Chicago, Ill.
Diamond Mfg. Co., Wyoming, Pa.
Erdle Perforating Co., Rochester, N. Y.
Harrington & King Perforating Co., Chicago.
Hendrick Mfg. Co., Carbondale, Pa.
Mundt, Chas., & Sons, 59 Fairmount Ave., Jersey City, N. J.

SCREENS—Woven Wire
Wickwire Brothers, Cortland, N. Y.
Wickwire Spencer Steel Co., 41 East 42nd St., N. Y. C.

SCREW MACHINE PRODUCTS
Barnes, Wallace Co., The, Div. of Associated Spring Corp., Bristol, Conn.
Blake & Johnson Co., The, Waterville, Ct.
Commonwealth Brass Corp., Detroit.
Eastern Mch. Screw Corp., New Haven.
Hoode Engineering Corp., Buffalo, N. Y.
National Acme Co., The, Cleveland.
Olson Mfg. Co., Worcester, Mass.
Ottemiller, Wm. H., Co., Inc., York, Pa.
Peck Spring Co., The, Plainville, Conn.
Progressive Mfg. Co., Torrington, Conn.
Screw Mch. Products Corp., Prov., R. I.

SCREW MACHINERY—Automatic
Brown & Sharpe Mfg. Co., Providence, R. I.
Cone Automatic Mach. Co., Inc., Windsor, Vt.
National Acme Co., The, Cleveland.

SCREW MACHINERY—Hand
Warner & Swasey Co., The, Cleveland.

SCREW MACHINERY—Multiple Spindle
Acme Machine Tool Co., Cincinnati.
Cone Automatic Mach. Co., Inc., Windsor, Vt.
National Acme Co., The, Cleveland.

SCREW PLATES
Greenfield (Mass.) Tap & Die Corp.

SCREW STOCK
Bliss & Laughlin, Inc., Harvey, Ill.
Union Drawn Steel Co., Massillon, Ohio.

SCREWS—Cap
Cleveland (Ohio) Cap Screw Co., The.
Lamson & Sessions Co., The Cleveland.
National Acme Co., The, Cleveland
Ottemiller, Wm. H., Co., Inc., York, Pa.

SCREWS—Coach or Lag
Lamson & Sessions Co., The, Cleveland.

SCREWS—Machine
Blake & Johnson Co., The, Waterville, Ct.
Lamson & Sessions Co., The, Cleveland.
Progressive Mfg. Co., The, Torrington, Ct.

SCREWS—Safety Set
Progressive Mfg. Co., The, Torrington, Ct.
Standard Pressed Steel Co., Jenkintown, Pa.

SCREWS—Set
Cleveland (Ohio) Cap Screw Co., The.
National Acme Co., The, Cleveland.
Ottemiller, Wm. H., Co., Inc., York, Pa.

Products Index

SCREWS, Socket, Head, Cap
Standard Pressed Steel Co., Jenkintown, Pa.

SCREWS—Thumb
Parker-Kalon Corp., 196 Varick St., N. Y.

SCRUBBING MACHINES—Sheet
Wean Engineering Co., Inc., The, Warren, Ohio.

SCYTHE STONES AND WHETSTONES
Carborundum Co., The, Niagara Falls, N.Y.

SECOND - HAND MACHINERY—(See Clearing House Section)

SEPARATORS—Magnetic
Dings Magnetic Separator Co., Milkauwee.
Ohio Electric Mfg. Co., The, 5908 Maurice Ave., Cleveland.
Stearns Magnetic Mfg. Co., 635 So. 28th St., Milwaukee.

SHAFTING—Cold Drawn
Union Drawn Steel Co., Massillon, Ohio.
Wyckoff Drawn Steel Co., Pittsburgh, Pa.

SHAFTING—Forged
Bay City Forge Co., Erie, Pa.

SHAFTING—Steel
Bliss & Laughlin, Inc., Harvey, Ill.
Union Drawn Steel Co., Massillon, Ohio.

SHAFTING—Turned and Ground
Bliss & Laughlin, Inc., Harvey, Ill.
Ryerson, Jos. T., & Son, Inc., Chicago.
Union Drawn Steel Co., Massillon, Ohio.
Wyckoff Drawn Steel Co., Pittsburgh, Pa.

SHAPERS
Cincinnati (Ohio) Shaper Co., The.

SHAPERS—Vertical
Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.

SHAPES—Cold Drawn
Bliss & Laughlin, Inc., Harvey, Ill.
Union Drawn Steel co., Massillon, Ohio.
Wyckoff Drawn Steel Co., Pittsburgh, Pa.

SHAPES—Wire
American Spring & Mfg. Corp., Holly, Mich.
Cuyahoga Spring Co., The, Cleveland.
Eastern Tool & Mfg. Co., Bloomfield, N. J.
Grammes, L. F., & Sons, Inc., Allentown, Pa.
Lee Spring Co., Inc., 30 Main St., Brooklyn, N. Y.
Roebling's, John A. Sons Co., Trenton, N. J.

SHEAR BLADES & KNIVES
American Shear Knife Co., Homestead, Pa.
Canton Fdry. & Mch. Co., Cleveland.

SHEARING MACHINES—Alligator
Canton Fdry. & Mch. Co., Cleveland.

SHEARING MACHINES—Angle, Hand and Power
Federal Bearings Co., Inc., The, Poughkeepsie, N. Y.
G. D. S. Machinery & Supply Co., Inc., 101 Walker St., N. Y. C.
Schatz Mfg. Co., The, Poughkeepsie, N. Y.

SHEARING MACHINES—Bar
G. D. S. Machinery & Supply Co., Inc., 101 Walker St., N. Y. C.
Schatz Mfg. Co., The, Poughkeepsie, N. Y.
United Engineering & Fdry. Co., Pitgh.

SHEARING MACHINES — Beam and Channel
Schatz Mfg. Co., The, Poughkeepsie, N. Y.
United Engineering & Fdry. Co., Pitgh.

SHEARING MACHINES—Billet
Morgan Engineering Co., The, Alliance, O.
Pels, Henry, & Co., Inc., 90 West St., N. Y. C.
Schatz Mfg. Co., The, Poughkeepsie, N. Y.
United Engineering & Fdry. Co., Pitgh.

SHEARING MACHINES — Continuous Sheet & Pack
Aetna-Standard Engineering Co., The, Youngstown, Ohio.

SHEARING MACHINES—Plate
Bertsch & Co., Cambridge City, Ind.
Cincinnati (Ohio) Shaper Co., The.
Dreis & Krump Mfg. Co., Chicago.
Mesta Mch. Co., Pittsburgh.
Morgan Engineering Co., The, Alliance, O.
Niagara Machine & Tool Works, Buffalo, N. Y.
Pels, Henry, & Co., Inc., 90 West St., N. Y. C.
Schatz Mfg. Co., The, Poughkeepsie, N. Y.
United Engineering & Fdry. Co., Pitgh.

SHEARING MACHINES — Sheet and Plate
Beatty Mch. & Mfg. Co., 936—150th St., Hammond, Ind.
Cincinnati (Ohio) Shaper Co., The.
Dreis & Krump Mfg. Co., Chicago.
Niagara Mach. & Tool Wks., Buffalo, N. Y.

SHEARING MACHINES—Squaring
Cincinnati (Ohio) Shaper Co., The.
Dreis & Krump Co., Chicago.
Niagara Mach. & Tool Wks., Buffalo, N. Y.

SHEARS—Hand for Sheet Metal
Bremil Mfg. Co., Erie, Pa.

SHEET BARS
Jones & Laughlin Steel Corp., Pittsburgh.

SHEET METAL MACHINERY
Cincinnati (Ohio) Shaper Co., The.
Dreis & Krump Mfg. Co., Chicago.
New Albany (Ind.) Mch. Mfg. Co.
Niagara Mach. & Tool Wks., Buffalo, N. Y.
Peck, Stow & Wilcox Co., The, Southington, Conn.
V & O Press Co., Hudson, N. Y.
Waterbury (Conn.) Farrel Foundry & Machine Co., The.

SHEETS—Aluminum
Aluminum Co. of America, Pittsburgh.

SHEETS—Auto Body
American Rolling Mill Co., Middletown, O.
Bethlehem (Pa.) Steel Co.
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Inland Steel Co., Chicago.
Republic Steel Corp., Cleveland, Ohio.
Youngstown (Ohio) Sheet & Tube Co., The.

SHEETS—Black
American Rolling Mill Co., Middletown, O.
Bethlehem (Pa.) Steel Co.
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Columbia Steel Co. (U. S. Steel Corp. Subsidiary), San Francisco, Calif.
Granite City (Ill.) Steel Co.
Ingersoll Steel & Disc Co., Chicago.
Inland Steel Co., Chicago.
Republic Steel Corp., Cleveland, Ohio.
Ryerson, Jos., T., & Son, Inc., Chicago.
Scully Steel Products Co. (U. S. Steel Corp. Subsidiary), Chicago.
Tennessee Coal, Iron & Railroad Co. (U. S. Steel Corp. Subsidiary), Birmingham, Ala.
Weirton (W. Va.) Steel Co.

SHEETS—Blue Annealed
Alan Wood Steel Co., Conshohocken, Pa.
American Rolling Mill Co., Middletown, O.
Bethlehem (Pa.) Steel Co.
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Granite City (Ill.) Steel Co.
Great Lakes Steel Corp., Detroit.
Ryerson, Jos. T., & Son, Inc., Chicago.
Weirton (W. Va.) Steel Co.
Worth Steel Co., Claymont, Del.

SHEETS—Brass, Bronze, Copper, Nickel, Silver or Phosphor Bronze
American Brass Co., The, Waterbury, Conn.
Phosphor Bronze Smelting Co., The, Phila.
Revere Copper & Brass, Inc., 230 Park Ave., N. Y. C.
Seymour (Conn.) Mfg. Co.

SHEETS—Chrome
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.

SHEETS—Chrome Nickel
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.

SHEETS—Cold Rolled
American Rolling Mill Co., Middletown, O.
Bethlehem (Pa.) Steel Co.
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Granite City (Ill.) Steel Co.
Great Lakes Steel Corp., Detroit.
Inland Steel Co., Chicago.
Republic Steel Corp., Cleveland, Ohio.
Ryerson, Jos., T., & Son, Inc., Chicago.
Weirton (W. Va.) Steel Co.

SHEETS—Copper Alloy
American Brass Co., The Waterbury, Conn.

SHEETS—Copper Steel
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Inland Steel Co., Chicago.

SHEETS—Electrical
American Rolling Mill Co., Middletown, O.
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Republic Steel Corp., Cleveland, Ohio.

SHEETS—Enameling
American Rolling Mill Co., Middletown, O.
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Columbia Steel Co. (U. S. Steel Corp. Subsidiary), San Francisco, Calif.
Great Lakes Steel Corp., Detroit.
Inland Steel Co., Chicago.

SHEETS—For Drawing and Stamping
American Rolling Mill Co., Middletown, O.
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Republic Steel Corp., Cleveland, Ohio.
Ryerson, Jos. T., & Son, Inc., Chicago.
Superior Sheet Steel Co., Canton, Ohio.
Worth Steel Co., Claymont, Del.

SHEETS—Full Finished
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Republic Steel Corp., Cleveland, Ohio.
Youngstown (Ohio) Sheet & Tube Co., The.

SHEETS—Galvanized, Flat and Corrugated
American Rolling Mill Co., Middletown, O.
Bethlehem (Pa.) Steel Co.
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Columbia Steel Co. (U. S. Steel Corp. Subsidiary), San Francisco, Calif.
Continental Steel Corp., Kokomo, Ind.
Granite City (Ill.) Steel Co.
Inland Steel Co., Chicago.
Republic Steel Corp., Cleveland, Ohio.
Ryerson, Jos. T., & Son, Inc., Chicago.

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Tennessee Coal, Iron & Railroad Co. (U. S. Steel Corp. Subsidiary), Birmingham, Ala.
Weirton (W. Va.) Steel Co.
Youngstown (Ohio) Sheet & Tube Co., The.

SHEETS—Lead
National Lead Co., 111 Bdway., N. Y. C.

SHEETS—Long Terne
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Weirton (W. Va.) Steel Co.

SHEETS—Magnesium Alloys
Dow Chemical Co., The, 921 Jefferson Ave., Midland, Mich.

SHEETS—Metal Furniture
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Republic Steel Corp., Cleveland, Ohio.

SHEETS—Pickled
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.

SHEETS—Tin Mill Black
American Rolling Mill Co., Middletown, O.
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.

SHEETS—Zinc
New Jersey Zinc Co., The, 160 Front St., N. Y. C.

SHELVING—Steel
Frick-Gallagher Mfg. Co., The, Wellston, Ohio.

SHOVELS—Mounted—See Cranes

SHUTTERS—Steel & Wood Bi-Folding
Kinnear Mfg. Co., Columbus, Ohio.

SILICO—MANGANESE
Electro Metallurgical Sales Corp., 30 E. 42nd St., N. Y. C.

SILICON METAL & ALLOYS
Electro Metallurgical Sales Corp., 30 E. 42nd St., N. Y. C.

SLINGS—Wire Rope
Murray Safety Sling Co., Inc., Pitts., Pa.
Roebling's, John A., Sons Co., Trenton, N. J.

SLOTTING MACHINES
Nazel Engineering & Machine Works, Philadelphia.

SOLVENTS—Oil & Grease
Detroit Rex Products Co., Detroit, Mich.

SPACING TABLES—Punching & Shearing
Thomas Mach. Mfg. Co., Pittsburgh.

SPECIAL MACHINERY
Baldwin-Southwark Corp., Southwark Div., Philadelphia.
Birdsboro (Pa.) Steel Foundry & Machine Co.
Bullard Co., The, Bridgeport, Conn.
Eastern Tool & Mfg. Co., Bloomfield, N. J.
Farquhar, A. B., Co., Ltd., York, Pa.
Gifford-Wood Co., Hudson, N. Y.
Houde Engineering Corp., Buffalo, N. Y.
Manville, E. J., Mch. Co., Waterbury, Ct.
Morgan Engineering Co., The, Alliance, O.
Taft-Peirce Mfg. Co., The, Woonsocket, R. I.
Wood, R. D., & Co., Philadelphia.

SPECIALTIES—Rubber Covered & Lined
Goodrich, B. F., Co., The, Akron, Ohio.

SPEED REDUCERS
Boston Gear Wks, Inc., North Quincy, Mass.
Cleveland (Ohio) Worm & Gear Co.
Horsburgh & Scott Co., 5112 Hamilton Ave., Cleveland.
James, D. O., Mfg. Co., Chicago.
Jones, W. A., Fdry. & Mch. Co., 4401 Roosevelt Rd, Chicago.
Link-Belt Co., Chicago.
Philadelphia (Pa.) Gear Works.
Poole Foundry & Mch. Co., Baltimore, Md.

SPIEGELEISEN
Electro Metallurgical Sales Corp., 30 E. 42nd St., N. Y. C.

SPIKES—Screw
Oliver Iron & Steel Corp., Pittsburgh.

SPIKES—Track
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Weirton (W. Va.) Steel Co.

SPINDLES—Grinding
Ex-Cell-O Corp., 1200 Oakman Blvd., Detroit.

SPINDLES—Hollow Bored
American Hollow Boring Co., 1912 Raspberry St., Erie, Pa.

SPLICE BARS
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.

SPRAY FINISHING EQUIPMENT
DeVilbiss Co., The, Toledo, Ohio.

SPRAYERS—Metal
Metals Coating Co. of America, Phila., Pa.

SPRAYERS—Paint
DeVilbiss Co., The, Toledo, Ohio.

SPRING MAKING MACHINERY
Baird Mch. Co., The, Bridgeport, Conn.
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington (Conn.) Mfg. Co., The.

SPRINGS—Car
Miller & Van Winkle, Inc., 18 Bridge St., Brooklyn, N. Y.

SPRINGS—Extension, Compression, Torsion or Flat
Amer. Spring & Mfg. Corp., Holly, Mich.
American Steel & Wire Co. (U. S. Steel Corp. Subsidiary), Chicago.
Barnes-Gibson-Raymond, Detroit Plant, Div. of Associated Spring Corp.
Barnes, Wallace Co., The, Div. of Associated Spring Corp., Bristol, Conn.
Cook Plant of Barnes-Gibson-Raymond, Div. of Associated Spring Corp., Ann Arbor, Mich.
Cuyahoga Spring Co., The, Cleveland.
Dunbar Bros. Co., Div. of Associated Spring Corp., Bristol, Conn.
Gibson, Wm. D., Co., Div. of Associated Spring Corp., Chicago.
Hubbard, M. D., Spring Co., 750 Central Ave., Pontiac, Mich.
Lee Spring Co., Inc., 30 Main St., Brooklyn, N. Y.
Miller & Van Winkle, Inc., 18 Bridge St., Brooklyn, N. Y.
Peck Spring Co., The, Plainville, Conn.
Raymond Mfg. Co., Div. of Associated Spring Corp., Corry, Pa.
U. S. Steel Wire Spring Co., Cleveland, O.
Wickwire Spencer Steel Co., 41 East 42nd St., N. Y. C.

SPROCKETS
Baldwin-Duckworth Chain Corp., Springfield, Mass.
Boston Gear Wks., Inc., North Quincy, Mass.
Diamond Chain & Mfg. Co., Indianapolis, Ind.
Morse Chain Co., Ithaca, New York.
Whitney Chain & Mfg. Co., Hartford, Ct.

STAMPINGS OR DRAWINGS—Metal
Barnes-Gibson-Raymond, Detroit Plant, Div. of Associated Spring Corp.
Barnes, Wallace Co., The, Div. of Associated Spring Corp., Bristol, Conn.
Central Iron & Steel Co., Harrisburg, Pa.
Champion Sheet Metal Co., Inc., cor. Squires & Duane Sts., Cortland, N. Y.
Cook Plant of Barnes-Gibson-Raymond, Div. of Associated Spring Corp., Ann Arbor, Mich.
Crosby Co., The, Buffalo, N. Y.
Dayton Rogers Mfg. Co., Minneapolis, Minn.
Dunbar Bros. Co., Div. of Associated Spring Corp., Bristol, Conn.
E S M C O Auto Products Corp., Bush Terminal Bldg. 27, Bklyn., N. Y.
Eastern Tool & Stpg. Co., Inc., Saugus, Mass.
Gibson, Wm. D., Co., Div. of Associated Spring Corp., Chicago.
Grammes, L. F., & Sons, Inc., Allentown, Pa.
Hubbard, M. D., Spring Co., 750 Central Ave., Pontiac, Mich.
Lansing (Mich.) Stamping Co., So. Penn. Ave.
Lee Spring Co., Inc., 30 Main St., Brooklyn, N. Y.
Miller & Van Winkle, Inc., 18 Bridge St., Brooklyn, N. Y.
New Monarch Machine & Stamping Co., Des Moines, Iowa.
Parish Pressed Steel Co., Reading, Pa.
Raymond Mfg. Co., Div. of Associated Spring Corp., Corry, Pa.
Sessions, J. H., & Son, Bristol, Conn.
Special Hardware Co., Medford, N. Y.
Toledo (Ohio) Stamping & Mfg. Co.
Torrington (Conn.) Company
Transue & Williams Steel Forging Corp., Alliance, Ohio.
Truscon Steel Co., Pressed Steel Div., Cleveland.
Wagner Specialty Co., Burlington, Wis.
Whitehead Stamping Co., 1669 W. Lafayette Blvd., Detroit, Mich.
Worcester (Mass.) Stamped Metal Co.

STAMPS—Steel Alphabets and Figures
Cunningham, M. E., Co., Pittsburgh.
Noble & Westbrook Mfg. Co., The, East Hartfrod, Ct.

STAPLES—Wire
Wickwire Brothers, Cortland, N. Y.

STEEL—Acid Resisting
Duriron Co., Inc., The, 438 N. Findlay St., Dayton, Ohio.

STEEL—Alloy
Alan Wood Steel Co., Conshohocken, Pa.
American Steel Export Co., Inc., 347 Madison Ave., N. Y. C.
Bethlehem (Pa.) Steel Company.
Bissett Steel Co., The, Cleveland.
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Harrisburg (Pa.) Steel Corp.
Ingersoll Steel & Disc Co., Chicago.
Jessop Steel Co., Washington, Pa.
Latrobe (Pa.) Electric Steel Co.
Ludlum Steel Co., Watervliet, N. Y.
Republic Steel Corp., Cleveland, Ohio.
Ryerson, Jos. T., & Son, Inc., Chicago.
Tennessee Coal, Iron & Railroad Co. (U. S. Steel Corp. Subsidiary), Birmingham, Ala.
Timken Roller Bearing Co., The, Canton, O.
Timken Steel & Tube Div., The Timken Roller Bearing Co., Canton, O.
Vanadium-Alloys Steel Co., Latrobe, Pa.
Wheelock, Lovejoy & Co., Inc., Cambridge, Mass.

STEEL—Alloy, Cold Drawn
Bliss & Laughlin, Inc., Harvey, Ill.
Union Drawn Steel Co., Massillon, Ohio.
Wheelock, Lovejoy & Co., Inc., Cambridge, Mass.
Wyckoff Drawn Steel Co., Pittsburgh, Pa.

Products Index

STEEL—Bright Finished
Bliss & Laughlin, Inc., Harvey, Ill.
Union Drawn Steel Co., Massillon, Ohio.

STEEL—Carbon
American Steel Export Co., Inc., 347 Madison Ave., N. Y. C.
Bethlehem (Pa.) Steel Co.
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Harrisburg (Pa.) Steel Corp.
Ingersoll Steel & Disc Co., Chicago.
Latrobe (Pa.) Electric Steel Co.

STEEL—Carbon Vanadium
Latrobe (Pa.) Electric Steel Co.

STEEL—Chrome
Latrobe (Pa.) Electric Steel Co.

STEEL—Chrome Manganese
Latrobe (Pa.) Electric Steel Co.

STEEL—Chrome Nickel
Harrisburg (Pa.) Steel Corp.
Latrobe (Pa.) Electric Steel Co.

STEEL—Chrome Nickel Silver
Ingersoll Steel & Disc Co., Chicago.

STEEL—Chrome Vanadium
Harrisburg (Pa.) Steel Corp.
Latrobe (Pa.) Electric Steel Co.

STEEL—Cobalt
Darwin & Milner, Inc., Cleveland.

STEEL—Cold Drawn
Bliss & Laughlin, Inc., Harvey, Ill.
Jones & Laughlin Steel Corp., Pittsburgh.
Latrobe (Pa.) Electric Steel Co.
Rathbone, A. B. & J., Palmer, Mass.
Ryerson, Joseph T., & Son, Inc., Chicago.
Union Drawn Steel Co., Massillon, Ohio.
Wyckoff Drawn Steel Co., Pittsburgh, Pa.

STEEL—Cold Rolled Strips
Acme Steel Co., Chicago.
American Steel & Wire Co. (U. S. Steel Corp. Subsidiary), Chicago.
Athenia Steel Co., Clifton, N. J.
Bethlehem (Pa.) Steel Co.
Cold Metal Process Co., The, Youngstown, Ohio.
Griffin Mfg. Co., Erie, Pa.
Latrobe (Pa.) Electric Steel Co.
Republic Steel Corp., Cleveland, Ohio.
Ryerson, Jos. T., & Sons, Inc., Chicago.
Scully Steel Products Co. (U. S. Steel Corp. Subsidiary), Chicago.
Stanley Works, The, New Britain, Conn.; Bridgeport, Conn.
Steel & Tubes, Inc., Cleveland.
Superior Steel Corp., Grant Bldg., Ptgh.
Thomas Steel Co., The, Warren, Ohio.
Weirton (W. Va.) Steel Co.
Wetherell Bros. Co., Cambridge, 39, Mass.

STEEL—Cold Rolled Strips, Electro Copper Coated
Thomas Steel Co., The, Warren, Ohio.

STEEL—Cold Rolled Strips, Electro-Galvanized
Acme Steel Co., Chicago, Ill.
Thomas Steel Co., The, Warren, Ohio.

STEEL—Cold Rolled Strips, Electro Tin Coated
Thomas Steel Co., The, Warren, Ohio.

STEEL—Cold Rolled Strips, Stainless
Acme Steel Co., Chicago.
Griffin Mfg. Co., Erie, Pa.

STEEL—Corrosion Resisting
Midvale Co., The, Nicetown, Phila., Pa.
Rustless Iron & Steel Corp., Baltimore, Md.

STEEL—Crucible
Jessop, Wm., & Sons, Inc., 121 Varick St., N. Y. C.
Jessop Steel Co., Washington, Pa.
Vanadium-Alloys Steel Co., Latrobe, Pa.

STEEL—Cutlery
Jessop Steel Co., Washington, Pa.
Latrobe (Pa.) Electric Steel Co.
Ludlum Steel Co., Watervliet, N. Y.

STEEL—Die
Disston, Henry, & Sons, Inc., Philadelphia.
Jessop, Wm., & Sons, Inc., 121 Varick St., N. Y. C.
Latrobe (Pa.) Electric Steel Co.
Ludlum Steel Co., Watervliet, N. Y.
Milne, A., & Co., 745 Washington St., N. Y. C.

STEEL—Drill
Latrobe (Pa.) Electric Steel Co.
Ludlum Steel Co., Watervliet, N. Y.
Milne, A., & Co., 745 Washington St., N. Y. C.

STEEL—Electric
Disston, Henry, & Sons, Inc., Philadelphia.
Latrobe (Pa.) Electric Steel Co.
Ludlum Steel Co., Watervliet, N. Y.
Timken Roller Bearing Co., The, Canton, O.
Timken Steel & Tube Div., The Timken Roller Bearing Co., Canton, O.
Wheelock, Lovejoy & Co., Inc., Cambridge, Mass.

STEEL—High Speed
Bethlehem (Pa.) Steel Company.
Cleveland (Ohio) Twist Drill Co., The.
Ingersoll Steel & Disc Co., Chicago.
Jessop Steel Co., Washington, Pa.
Latrobe (Pa.) Electric Steel Co.
Ludlum Steel Co., Watervliet, N. Y.
Milne, A., & Co., 745 Washington St., N. Y. C.
Vanadium-Alloys Steel Co., Latrobe, Pa.

STEEL—Hot Rolled Strips
Acme Steel Co., Chicago.
Bethlehem (Pa.) Steel Co.
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Great Lakes Steel Corp., Detroit.
Inland Steel Co., Chicago.
Laclede Steel Co., St. Louis, Mo.
Latrobe (Pa.) Electric Steel Co.
Republic Steel Corp., Cleveland, Ohio.
Scully Steel Products Co. (U. S. Stee Corp. Subsidiary), Chicago.
Stanley Works, The, New Britain, Conn., Bridgeport, Conn.
Steel & Tubes, Inc., Cleveland.
Superior Steel Corp., Grant Bldg., Ptgh.
Weirton (W. Va.) Steel Co.

STEEL—Hot Rolled Strips, Electro Zinc Coated
Thomas Steel Co., The, Warren, Ohio.

STEEL—Hot Rolled Strips, Galvanized
Acme Steel Co., Chicago.

STEEL—Magnet
Latrobe (Pa.) Electric Steel Co.

STEEL—Open Hearth
Pittsburgh (Pa.) Steel Co.
Timken Roller Bearing Co., The, Canton, O.
Timken Steel & Tube Div., The Timken Roller Bearing Co., Canton, O.

STEEL—Rustless
Acme Steel Co., Chicago.
Griffin Mfg. Co., Erie, Pa.
Latrobe (Pa.) Electric Steel Co.
Ludlum Steel Co., Watervliet, N. Y.
Rustless Iron & Steel Corp., Baltimore, Md.

STEEL—Screw
Bliss & Laughlin, Inc., Harvey, Ill.
Timken Roller Bearing Co., The, Canton, O.
Timken Steel & Tube Div., The Timken Roller Bearing Co., Canton, O.
Union Drawn Steel Co., Massillon, Ohio.
Wyckoff Drawn Steel Co., Pittsburgh, Pa.

STEEL—Special Analysis
Harrisburg (Pa.) Steel Corp.
Latrobe (Pa.) Electric Steel Co.
Ludlum Steel Co., Watervliet, N. Y.
Republic Steel Corp., Cleveland, Ohio.
Timken Roller Bearing Co., The, Canton, O.
Timken Steel & Tube Div., The Timken Roller Bearing Co., Canton, O.

STEEL—Spring
Athenia Steel Co., Clifton, N. J.
Barnes-Gibson-Raymond, Detroit Plant, Div. of Associated Spring Corp.
Barnes, Wallace, Co., The, Div. of Associated Spring Corp., Bristol, Conn.
Gibson, Wm. D., Co., Div. of Associated Spring Corp., Chicago.
Great Lakes Steel Corp., Detroit.
Republic Steel Corp., Cleveland, Ohio.
Timken Roller Bearing Co., The, Canton, O.
Timken Steel & Tube Div., The Timken Roller Bearing Co., Canton, O.

STEEL-Stainless
Acme Steel Co., Chicago.
American Rolling Mill Co., Middletown, O.
Bethlehem (Pa.) Steel Company.
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Disston, Henry, & Sons, Inc., Philadelphia.
Latrobe (Pa.) Electric Steel Co.
Ludlum Steel Co., Watervliet, N. Y.
Midvale Co., The, Nicetown, Phila., Pa.
Republic Steel Corp., Cleveland, Ohio.
Rustless Iron & Steel Corp., Baltimore, Md.
Ryerson, Jos. T., & Sons, Inc., Chicago.
Scully Steel Products Co. (U. S. Steel Corp. Subsidiary), Chicago.
Superior Steel Corp., Grant Bldg., Pittsburgh.
Union Drawn Steel Co., Massillon, Ohio.
Wetherell Bros. Co., Cambridge, 39, Mass.

STEEL—Stainless Clad
Ingersoll Steel & Disc Co., Chicago.

STEEL—Tool
Bethlehem (Pa.) Steel Company.
Bissett Steel Co., The Cleveland.
Darwin & Milner, Inc., Cleveland.
Disston, Henry, & Sons, Inc., Philadelphia.
Ingersoll Steel & Disc Co., Chicago.
Jessop Steel Co., Washington, Pa.
Jessop, Wm., & Sons, Inc., 121 Varick St., N. Y. C.
Latrobe (Pa.) Electric Steel Co.
Ludlum Steel Co., Watervliet, N. Y.
Midvale Co., The, Nicetown, Phila., Pa.
Milne, A., & Co., 745 Washington St., N. Y. C.
Ryerson, Jos., T., & Son, Inc., Chicago.
Tennessee Coal, Iron & Railroad Co. (U. S. Steel Corp. Subsidiary), Birmingham, Ala.
Vanadium-Alloys Steel Co., Latrobe, Pa.
Wheelock, Lovejoy & Co., Inc., Cambridge, Mass.
Windau Steel Co., Cleveland.

STEEL—Tool, Special Shapes
Forging & Casting Corp., The, Ferndale, Mich.
Latrobe (Pa.) Electric Steel Co.

STEEL—Vanadium
Latrobe (Pa.) Electric Steel Co.

STEEL PLANTS AND ROLLING MILLS
Brassert, H. A., & Co., Chicago, Ill.

STEEL ROLLS
United Engineering & Fdry. Co., Ptgh.

STOKERS
Babcock & Wilcox Co., The, 85 Liberty St., New York City.
Whiting Corp., Harvey, Ill.

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STOPS—Crane Limit
Electric Controller & Mfg. Co., The, Cleveland.

STRAIGHTENING MACHINES—Bar & Tube
Aetna-Standard Engineering Co., The, Youngstown, Ohio.
Medart Co., The, St. Louis, Mo.

STRUCTURAL IRON AND STEEL WORK
American Bridge Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.
Bethlehem (Pa.) Steel Co.
Morgan Engineering Co., The, Alliance, O.

STRUCTURAL STEEL — See Angles, Beams, Channels and Tees

STUDS
Erie (Pa.) Bolt & Nut Co.

SUB PRESSES
U. S. Tool Co., Inc., Ampere, N. J.

SUPERHEATERS
Babcock & Wilcox Co., The, 85 Liberty St., New York City.

SWAGING MACHINES
Standard Machinery Co., Providence, R. I.
Torrington (Conn.) Company.

SWITCHES—Electric
Westinghouse Elec. & Mfg. Co., East Ptgh.

TANK LININGS
Cellcote Co., The Cleveland.
Nukem Prods. Corp., 68 Niagara St., Buffalo, N. Y.

TANK LININGS—Rubber
Goodrich, B. F., Co., The, Akron, Ohio.
Goodyear Tire & Rubber Co., Akron, Ohio.
Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., The, 2 Townsend St., Passaic, N. J.

TANKS—Alkali Cleaning
Detroit Rex Products Co., Detroit, Mich.

TANKS—Compressed Air, Gas, Oil and Water
Scaife, Wm. B., & Sons Co., Ptgh.
Westinghouse Air Brake Co., Industrial Div., Pittsburgh.

TANKS—Iron and Steel
Munroe R., & Sons Mfg. Corp., Pittsburgh.
Scaife, Wm. B., & Sons, Co., Ptgh.

TANKS—Lead Lined
Dietzel Lead Burning Co., Pittsburgh.

TANKS—Pickling
Atlas Mineral Prods. Co. of Pa., The, Mertztown, Pa.
Blaw-Knox Co., Pittsburgh.
Cleveland (Ohio) Quarries Co., The.
Goodrich, B. F., Co., The, Akron, Ohio.
Goodyear Tire & Rubber Co., Akron, Ohio.
Haveg Corporation, Newark, Delaware.
Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., The, 2 Townsend St., Passaic, N. J.
Nukem Products Corp., 68 Niagara St., Buffalo, N. Y.

TANKS—Rubber Lined
Blaw-Knox Co., Pittsburgh.
Goodrich, B. F., Co., The, Akron, Ohio.
Goodyear Tire & Rubber Co., Akron, Ohio.
Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., The, 2 Townsend St., Passaic, N. J.

TANKS—Welded
Blaw-Knox Co., Pittsburgh.
National Tube Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.
Scaife, Wm. B., & Sons Co., Pittsburgh.

TAPPING MACHINES
Baker Bros. Inc., Toledo, Ohio.
Ex-Cell-O Corp., 1200 Oakman Blvd., Detroit.
National Automatic Tool Co., Richmond, Ind.

TAPS—Collapsing
Landis Mach. Co., Inc., Waynesboro, Pa.
Murchey Machine & Tool Co., Detroit.
National Acme Co., The, Cleveland.

TAPS AND DIES
Greenfield (Mass.) Tap & Die Corp.
Landis Mch. Co., Inc., Waynesboro, Pa.
Morse Twist Drill & Mch. Co., New Bedford, Mass.
Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.

TEES—See Angles, Beams, Channels and Tees

TELEPHONES—Interior
Screw Machine Products Corp., Prov., R. I.

TERNE PLATES
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Weirton (W. Va.) Steel Co.

TESTING MACHINES—Ductility
Olsen, Tinius Testing Machine Co., Philadelphia.

TESTING MACHINES—Hardness
Olsen, Tinius Testing Machine Co., Philadelphia.
Shore Instrument & Mfg. Co., The, Jamaica, L. I., N. Y.

TESTING MACHINES—Impact
Olsen, Tinius Testing Machine Co., Philadelphia.

TESTING MACHINES—Materials
Baldwin-Southwark Corp., Southwark Div., Phila.
Olsen, Tinius Testing Machine Co., Philadelphia.

TESTING MACHINES—Spring
Olsen, Tinius Testing Machine Co., Philadelphia.

TESTING MACHINES—Tensile
Olsen, Tinius Testing Machine Co., Philadelphia.

TESTING MACHINES—Torsion
Olsen, Tinius Testing Machine Co., Philadelphia.

TESTING MACHINES—Universal
Olsen, Tinius Testing Machine Co., Philadelphia.

THERMOMETERS
Weston Electrical Instrument Corp., Newark, N. J.

THERMOMETERS—Recording
Brown Instrument Co., The, Philadelphia, Pa.
Leeds & Northrup Co., Philadelphia.

THERMOSTATIC—Bimetal
Chace, W. M., Co., 1605 Beard Ave., Detroit.

THREAD CUTTING TOOLS—See Die Taps

THREAD ROLLING MACHINES
Manville, E. J., Mch. Co., Waterbury, Ct.
Nilson, A. H., Mach. Co., Bridgeport, Ct.
Waterbury (Ct.) Farrel Fdry. & Mch. Co., The.

THREADING MACHINES
Eastern Mcsh. Screw Corp., New Haven, Conn.
Landis Mch. Co., Inc., Waynesboro, Pa.

THREADING MACHINES—Automatic
Landis Mch. Co., Inc., Waynesboro, Pa.

THREADING MACHINES—Bolt
Murchey Machine & Tool Co., Detroit.

TIE PLATES
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Weirton (W. Va.) Steel Co.

TIES—BALE
Acme Steel Co., Chicago, Ill.

TIN PLATE
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Granite City (Ill.) Steel Co.
Inland Steel Co., Chicago.
Jones & Laughlin Steel Corp., Pittsburgh.
Republic Steel Corp., Cleveland, Ohio.
Weirton (W. Va.) Steel Co.
Youngstown (Ohio) Sheet & Tube Co., The.

TIN PLATE MACHINERY
Aetna-Standard Engineering Co., The, Youngstown, Ohio.
Wean Engineering Co., Inc., The, Warren, Ohio.

TINNING EQUIPMENT—Sheets
Wean Engineering Co., Inc., The, Warren, Ohio.

TOOL BITS
Carboloy Co., Inc., 2985 E. Jefferson Ave., Detroit.

TOOL HOLDERS
Armstrong Bros. Tool Co., Chicago.
Williams, J. H., & Co., Buffalo, N. Y.

TOOLS—Lathe
Armstrong Bros. Tool Co., Chicago.
Carboloy Co., Inc., 2985 E. Jefferson Ave., Detroit.

TOOLS—Metal Cutting
Carboloy Co., Inc., 2985 E. Jefferson Ave., Detroit.
Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.

TOOLS—Precision
Starrett, L. S., Co., Athol, Mass.

TOOLS—Safety, Steel Stamp
Cunningham, M. E., Co., Pittsburgh.

TOOLS—Tungsten Carbide
Carboloy Co., Inc., 2985 E. Jefferson Ave., Detroit.
Ex-Cell-O Corp., 1200 Oakman Blvd., Detroit.

TORCHES—Brazing, Cutting and Welding
Air Reduction Sales Co., 60 East 42nd St., N. Y. C.
Linde Air Products Company, The, 30 East 42nd St., N. Y. C.
Weldit Acetylene Co., Detroit.

TRACTORS AND TRAILERS — See Trucks, Tractors and Trailers—Industrial

TRAILERS—Industrial—See Trucks, Tractors and Trailers—Industrial

TRAMRAILS—Overhead Systems
Cleveland Tramrail Div. of The Cleveland Crane & Engng. Co., Wickliffe, Ohio.
Harnischfeger Corp., 4401 W. National Ave., Milwaukee.

TRAMWAYS—Wire Rope
Leschen, A., & Sons Rope Co., St. Louis, Mo.

TRANSCRIBING MACHINES
Dictaphone Sales Corp., 420 Lexington Ave., New York City.

TRANSMISSIONS—Hydraulic
American Engineering Co., Philadelphia.
Oilgear Co., The, 1311 W. Bruce St., Milwaukee.

TRANSMISSIONS—Variable Speed
Link-Belt Co., Chicago.
Reeves Pulley Co., Columbus, Indiana.

TRAPS—Steam
Nicholson, W. H., & Co., 165 Oregon St., Wilkes-Barre, Pa.

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TREADS—Safety
American Pressed Steel Co., Phila., Pa.
Blaw-Knox Co., Pittsburgh.
Central Iron & Steel Co., Harrisburg, Pa.
Hendrick Mfg. Co., Carbondale, Pa.
Norton Co., Worcester, Mass.

TROLLEYS
Curtis Pneumatic Machinery Co., 1948 Kienlen Ave., St. Louis, Mo.
Hanna Engineering Works, 1761 Elston Ave., Chicago.

TRUCKS—Dump (Industrial)
Towmotor, Inc., Cleveland.

TRUCKS—Elevating (Power)
Baker-Raulang Co., The, 2175 W. 25th St., Cleveland.
Barrett-Cravens Co., Chicago.
Elwell-Parker Electric Co., The, Cleveland.
Towmotor, Inc., Cleveland.
Yale & Towne Mfg. Co., The, Phila. Div., Phila., Pa.

TRUCKS—Factory, Hand
Lewis-Shepard Co., 122 Walnut St., Watertown Station, Boston.

TRUCKS—Lift (Hand & Foot)
Barrett-Cravens Co., Chicago, Illinois.
Lewis-Shepard Co., 122 Walnut St., Watertown Station, Boston.
Yale & Towne Mfg. Co., The, Phila. Div., Phila., Pa.

TRUCKS—Scoop (Industrial)
Towmotor, Inc., Cleveland.

TRUCKS, TRACTORS AND TRAILERS—Industrial
Atlas Car & Mfg. Co., The, Cleveland.
Baker-Raulang Co., The, 2175 W. 25 St., Cleveland.
Elwell-Parker Electric Co., The, Cleveland.
Towmotor, Inc., Cleveland.
Yale & Towne Mfg. Co., The, Phila., Div., Phila., Pa.

TUBE MILL MACHINERY
Aetna-Standard Engineering Co., The, Youngstown, Ohio.
Taylor-Wilson Mfg. Co., McKees Rocks, Pa.
United Engineering & Fdry. Co., Ptgh.
Waterbury (Conn.) Farrel Foundry & Machine Co., The.

TUBES—Boiler
National Tube Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.
Ohio Seamless Tube Co., Shelby, Ohio.
Pittsburgh (Pa.) Steel Co.
Steel & Tubes, Inc., Cleveland.

TUBES—Copper Alloy
American Brass Co., The, Waterbury, Conn.

TUBES—High Carbon
Ohio Seamless Tube Co., Shelby, Ohio.
Steel & Tubes, Inc., Cleveland.

TUBES—Nickel Silver
American Brass Co., The, Waterbury, Conn.
Revere Copper & Brass, Inc., 230 Park Ave., N. Y. C.

TUBES—Stainless Steel
Cleveland (Ohio) Tool & Supply Co., The.
National Tube Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.
Ryerson, Jos., T., & Son, Inc., Chicago.
Steel & Tubes, Inc., Cleveland.

TUBING—Aluminum Seamless
Aluminum Co. of America, Pittsburgh.

TUBING—Flexible Metallic
Pennsylvania Flexible Metallic Tubing Co., Philadelphia.

TUBING—Magnesium Alloys
Dow Chemical Co., The, 921 Jefferson Ave., Midland, Mich.

TUBING—Nichrome
Steel & Tubes, Inc., Cleveland..

TUBING—Open Seam
Steel & Tubes, Inc., Cleveland.

TUBING—Phosphor Bronze
American Brass Co., The, Waterbury, Conn.
Phosphor Bronze Smelting Co., The, Phila.
Revere Copper & Brass, Inc., 230 Park Ave., N. Y. C.

TUBING—Rubber
Goodrich, B. F., Co., The, Akron, Ohio.

TUBING—Seamless Steel
National Tube Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.
Ohio Seamless Tube Co., Shelby, Ohio.
Pittsburgh (Pa.) Steel Co.
Ryerson, Jos. T., & Son, Inc., Chicago.
Steel & Tubes, Inc., Cleveland.
Timken Roller Bearing Co., The, Canton, O.
Timken Steel & Tube Div., The Timken Roller Bearing Co., Canton, O.
Youngstown (Ohio) Sheet & Tube Co., The.

TUBING—Square and Rectangular
Steel & Tubes, Inc., Cleveland.

TUBING—Stainless Steel
Cleveland (Ohio) Tool & Supply Co., The.
Steel & Tubes, Inc., Cleveland.

TUBING—Tinned Brass or Copper
Bundy Tubing Co., Detroit, Mich.

TUBING—Tinned-Steel
Bundy Tubing Co., Detroit, Mich.

TUBING—Tool Steel
Bissett Steel Co., The, Cleveland.

TUBING—Welded Steel
Bundy Tubing Co., Detroit, Mich.
National Tube Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.
Ohio Seamless Tube Co., Shelby, Ohio.
Steel & Tubes, Inc., Cleveland.
Youngstown (Ohio) Sheet & Tube Co., The.

TUBULAR PRODUCTS
National Tube Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.
Steel & Tubes, Inc., Cleveland.

TUMBLING BARRELS—See Barrels—Tumbling

TUNGSTEN—Metals & Alloys
Electro Metallurgical Sales Corp., 30 E. 42nd St., N. Y. C.

TUNGSTEN CARBIDE
Carboloy Co., Inc., 2985 E. Jefferson Ave., Detroit.

TURBINE-GENERATORS—Steam
General Electric Co., Schenectady, N. Y.
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

TURBO-COMPRESSORS
Spencer Turbine Co., Hartford, Conn.

TURNTABLES
American Bridge Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.

TURNTABLES—Industrial
Canton Fdry. & Mch. Co., Cleveland.

TWIST DRILLS
Cleveland (Ohio) Twist Drill Co., The.
Greenfield (Mass.) Tap & Die Corp.
Morse Twist Drill & Mch. Co., New Bedford, Mass.

TYPE—Steel
Noble & Westbrook Mfg. Co., The, East Hartford, Ct.

UNIONS
Crane Co., Chicago.

UNIT HEATERS—Electric
American Foundry Equipment Co., The, 401 Byrkit St., Mishawaka, Ind.

VALVES—Acid Resisting
Dietzel Lead Burning Co., Pittsburgh
Duriron Co., Inc., The, 438 N. Findlay St., Dayton, Ohio.
National Lead Co., 111 Bdway., N. Y. C.

VALVES—Air Blast for Presses
Littell, F. J., Mch. Co., Chicago.

VALVES—Air & Hydraulic Control
Brown Instrument Co., The, Philadelphia, Pa.
Galland-Henning Mfg. Co., Milwaukee.
Hanna Engineering Works, 1761 Elston Ave., Chicago.
Hannifin Mfg. Co., Chicago.
Nicholson, W. H., & Co., 165 Oregon St., Wilkes-Barre, Pa.
Tomkins-Johnson Co., The, Jackson, Mich.
Westinghouse Air Brake Co., Industrial Div., Pittsburgh.

VALVES—Gas, Water and Steam
Brown Instrument Co., The, Philadelphia, Pa.
Crane Co., Chicago.
Jarecki Mfg. Co., Erie, Pa.
North American Mfg. Co., The, Cleveland.
Wood, R. D., & Co., Philadelphia.

VALVES—Hydraulic
Baldwin-Southwark Corp., Southwark Div., Philadelphia.
Birdsboro (Pa.) Steel Foundry & Machine Co.
Crane Co., Chicago.
Galland-Henning Mfg. Co., Milwaukee.
Wood, R. D., & Co., Philadelphia.

VALVES—(Pressure Seated) Pneumatic
Cleveland (Ohio) Pneumatic Tool Co., The.

VALVES—Proportioning
Brown Instrument Co., The, Philadelphia, Pa.
North American Mfg. Co., The, Cleveland.

VALVES—Pump, Rubber
Garlock Packing Co., The, Palmyra, N. Y.

VANADIUM
Electro Metallurgical Sales Corp., 30 E. 42nd St., N. Y. C.

VISES
Cincinnati (Ohio) Milling Mch. Co., The.
Jarecki Mfg. Co., Erie, Pa.
Knu-Vise Products Co., Detroit, Mich.

WASHERS—Iron or Steel
Sessions, J. H., & Son, Bristol, Conn.

WASHERS—Leather
Chicago (Ill.) Rawhide Mfg. Co., The, 1306 Elston Ave.

WASHERS—Lock
American Nut & Bolt Fastener Co., Pittsburgh.
Reall Tool Co., East Alton, Ill.
Butcher & Hart Mfg. Co., Toledo, Ohio.
Eaton Mfg. Co., Massillon, Ohio.
Hobbs Mfg. Co., Worcester, Mass.
Houde Engineering Corp., Buffalo, N. Y.
National Lock Washer Co., The, Newark, N. J. and Milwaukee, Wis.
Philadelphia Steel & Wire Corp., Germantown, Philadelphia, Pa.
Positive Lock Washer Co., The, Newark, N. J.
Spring Washer Industry, 616 Wrigley Bldg., Chicago, Ill.
Washburn Co., The, Worcester, Mass.

WASHERS—Spring
American Nut & Bolt Fastener Co., Pittsburgh.
Reall Tool Co., East Alton, Ill.
Butcher & Hart Mfg. Co., Toledo, Ohio.
Eaton Mfg. Co., Massillon, Ohio.
Hobbs Mfg. Co., Worcester, Mass.
National Lock Washer Co., The, Newark, N. J., and Milwaukee, Wis.
Philadelphia Steel & Wire Corp., Germantown, Philadelphia, Pa.
Positive Lock Washer Co., The, Newark, N. J.
Spring Washer Industry, 616 Wrigley Bldg., Chicago, Ill.
Washburn Co., The, Worcester, Mass.

Products Index

WASHING MACHINES—For Metal Parts
Ransohoff, N., Inc., Cincinnati.

WASTE—Wiping
Lillie, Dexter P., Co., New Bedford, Mass.

WATER SOFTENERS AND PURIFIERS
Scaife, Wm. B., & Sons Co., Ptgh.

WELDING—Copper Hydrogen Electric
Bundy Tubing Co., Detroit, Mich.

WELDING—Electric
Federal Machine & Welder Co., Warren, Ohio.
Lincoln Electric Co., The, Cleveland.
Una Welding, Inc., Cleveland, Ohio.
Westinghouse Elec. & Mfg. Co., East Ptgh.

WELDING CONTACTS—Resistance
Electroloy Co., Inc., 50 Church St., New York City.

WELDING AND CUTTING MACHINES AND EQUIPMENT—Oxy-Acetylene
Air Reduction Sales Co., 60 East 42nd St., N. Y. C.
Linde Air Products Company, The, 30 East 42nd St., N. Y. C.
Weldit Acetylene Co., Detroit.

WELDING FIXTURES
Harnischfeger Corp., 4401 W. National Ave., Milwaukee.
Una Welding, Inc., Cleveland, Ohio.

WELDING MACHINES—Butt
Federal Machine & Welder Co., Warren, Ohio.
Swift Electric Welder Co., Detroit.
Thomson-Gibb Elec. Welding Co., Lynn, Mass.

WELDING MACHINES—Electric Arc
Electric Arc Cutting & Welding Co., The, Newark, N. J.
General Electric Co., Schenectady, N. Y.
Harnischfeger Corp., 4401 W. National Ave., Milwaukee, Wis.
Lincoln Electric Co., The, Cleveland.
Una Welding, Inc., Cleveland, Ohio.
Westinghouse Elec. & Mfg. Co., East Ptgh.
Wilson Welder & Metals Co., Inc., 60 E. 42nd St., New York City.

WELDING MACHINES—Electric Arc, Second-Hand. (See Clearing House Section)

WELDING MACHINES—Flash
Federal Machine & Welder Co., Warren, Ohio.
Swift Electric Welder Co., Detroit.
Thomson-Gibb Elec. Welding Co., Lynn, Mass.

WELDING MACHINES—Press
Federal Machine & Welder Co., Warren, Ohio.
Swift Electric Welder Co., Detroit.

WELDING MACHINES—Seam
Federal Machine & Welder Co., Warren, Ohio.

WELDING MACHINES—Spot
Federal Machine & Welder Co., Warren, Ohio.
Swift Electric Welder Co., Detroit.
Thomson-Gibb Elec. Welding Co., Lynn, Mass.

WELDING MACHINES—Universal Spot & Arc
Electric Arc Cutting & Welding Co., The, Newark, N. J.

WHEELS—Rolled Steel
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Standard Steel Wks. Co., Burnham, Pa.

WIRE—Aluminum
Aluminum Co. of America, Pittsburgh.

WIRE—Barb
Jones & Laughlin Steel Corp., Pittsburgh.
Pittsburgh (Pa.) Steel Co.

WIRE—Brass, Bronze, Copper, Nickel Silver or Phosphor Bronze
American Brass Co., The, Waterbury, Conn.
Phosphor Bronze Smelting Co., The, Phila.
Revere Copper & Brass, Inc., 230 Park Ave., N. Y. C.
Seymour (Conn.) Mfg. Co.

WIRE—Electric Heat Resisting
Globar Div., The Carborundum Co., Niagara Falls, N. Y.

WIRE—Flat, Round, Square or Special Shapes
American Steel & Wire Co. (U. S. Steel Corp. Subsidiary), Chicago.
Barnes, Wallace Co., The, Div. of Associated Spring Corp., Bristol, Conn.
Page Steel & Wire Div., American Chain & Cable Co., Inc., Monessen, Pa.
Prentiss, Geo. W., & Co., Holyoke, Mass.
Roebling's, John A., Sons Co., Trenton, N. J.
Seneca Wire & Mfg. Co., The, Fostoria, O.
Wickwire Bros., Cortland, N. Y.
Wickwire Spencer Steel Co., 41 East 42nd St., N. Y. C.

WIRE—Insulated
American Steel & Wire Co. (U. S. Steel Corp. Subsidiary), Chicago.
Roebling's, John A., Sons Co., Trenton, N. J.

WIRE—Mattress
Roebling's, John A., Sons Co., Trenton, N. J.

WIRE—Netting
Roebling's, John A., Sons Co., Trenton, N. J.
Wickwire Brothers, Cortland, N. Y.

WIRE—Piano and Music
Webb Wire Works, New Brunswick, N. J.
Wickwire Spencer Steel Co., 41 East 42nd St., N. Y. C.

WIRE—Rustless
Rustless Iron & Steel Corp., Baltimore, Md.

WIRE—Special Drawn Shapes
Rathbone, A. B. & J., Palmer, Mass.

WIRE—Spring
American Steel & Wire Co. (U. S. Steel Corp. Subsidiary), Chicago.
Barnes, Wallace Co., The, Div. of Associated Spring Corp., Bristol, Conn.
Columbia Steel Co. (U. S. Steel Corp. Subsidiary), San Francisco, Calif.
Jones & Laughlin Steel Corp., Pittsburgh.
Pittsburgh (Pa.) Steel Co.
Roebling's, John A., Sons Co., Trenton, N. J.
Seneca Wire & Mfg. Co., The, Fostoria, Ohio.

WIRE—Spring (Music)
Webb Wire Works, New Brunswick, N. J.

WIRE—Stainless Steel
Page Steel & Wire Div., American Chain & Cable Co., Inc., Monessen, Pa.
Rustless Iron & Steel Corp., Baltimore, Md.
Webb Wire Works, New Brunswick, N. J.

WIRE—Steel
Bethlehem (Pa.) Steel Co.
Prentiss, Geo. W., & Co., Holyoke, Mass.
Wickwire Brothers, Cortland, N. Y.

WIRE—Welding
Air Reduction Sales Co., 60 East 42nd St., N. Y. C.
American Steel & Wire Co. (U. S. Steel Corp. Subsidiary), Chicago.
Lincoln Electric Co., The, Cleveland.
Maurath, Inc., 7400 Union Ave., Cleveland.
Page Steel & Wire Div., American Chain & Cable Co., Inc., Monessen, Pa.
Pittsburgh (Pa.) Steel Co.
Revere Copper & Brass, Inc., 230 Park Ave., N. Y. C.
Roebling's, John A., Sons Co., Trenton, N. J.
Seneca Wire & Mfg. Co., The, Fostoria, Ohio.
Una Welding, Inc., Cleveland, Ohio.
Wickwire Brothers, Cortland, N. Y.
Wickwire Spencer Steel Co., 41 East 42nd St., N. Y. C.
Wilson Welder & Metals Co., Inc., 60 E. 42nd St., New York City.

WIRE—Zinc
Platt Bros. & Co., The, Waterbury, Conn.

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Buffalo (N. Y.) Wire Wks. Co., Inc.
Roebling's, John A., Sons Co., Trenton, N. J.
Wickwire Bros., Cortland, N. Y.
Wickwire Spencer Steel Co., 41 East 42nd St., N. Y. C.

WIRE DRAWING MACHINERY—See Wire Mill Mchry. & Equip.

WIRE FORMING MACHINERY
Baird Mch. Co., The, Bridgeport, Conn.
Manville, E. J., Mch. Co., Waterbury, Ct.
Nilson, A. H., Mach. Co., Bridgeport, Ct.
Sleeper & Hartley, Inc., Worcester, Mass.
U. S. Tool Co., Inc., Ampere, N. J.

WIRE MILL MACHINERY AND EQUIPMENT
Morgan Construction Co., Worcester, Mass.
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Torrington (Conn.) Mfg. Co., The.
Waterbury (Ct.) Farrel Fdry. & Mch. Co., The.

WIRE NAIL MACHINERY
Sleeper & Hartley, Inc., Worcester, Mass.

WIRE PRODUCTS
American Spring & Mfg. Corp., Holly, Mich.
American Steel & Wire Co. (U. S. Steel Corp. Subsidiary), Chicago.
Buffalo (N. Y.) Wire Wks. Co., Inc.
Eastern Tool & Mfg. Co., Bloomfield, N. J.
Hindley Mfg. Co., Valley Falls, R. I.
Pittsburgh (Pa.) Steel Co.
U. S. Steel Wire Spring Co., Cleveland, O.
Wickwire Bros., Cortland, N. Y.
Wickwire Spencer Steel Co., 41 East 42nd St., N. Y. C.

WIRE ROPE
American Steel & Wire Co. (U. S. Steel Corp. Subsidiary), Chicago.
Columbia Steel Co. (U. S. Steel Corp. Subsidiary), San Francisco, Calif.
Leschen, A., & Sons Rope Co., St. Louis, Mo.
Roebling's, John A., Sons Co., Trenton, N. J.
Wickwire Spencer Steel Co., 41 East 42nd St., N. Y. C.

WIRE ROPE FITTINGS
Roebling's, John A., Sons Co., Trenton, N. J.

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No. 2—60" Goss Hobber
No. 6—60", No. 6—72", Brown & Sharpe
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No. 2 B. & S. Universal
No. 4—12"x66" Landis Universal
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24"x10', 14' American
24"x12', 14' Lodge & Shipley, sel. grd. hd.
24"x16' American Grd. Hd., T.A.
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30"x11" American grd. hd.
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36"x30' Rahn Larmon, grd. head
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No. 2-B, No. 3-B Milwaukee
No. 2-B, No. 3-B, No. 4-B, B. & S., plain
No. 4 Cincinnati, plain
No. 1½, No. 2 B. & S. Universal
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No. 3 Cinn.-Acme, A.C. & B.F.
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GRINDER. No. 4 Brown & Sharpe Univ.
GRINDER. No. 12 Bryant Internal
GRINDER. Nos. 70, 72, 72A3, 75 Heald
GRINDER. No. 2 Cincinnati centerless
GRINDER. 30"x72" Springfield surface
GRINDER. 26", No. 16 Blanchard surface
GRINDER. 12" Arter rotary surface
HAMMER. No. 5, type I Nazel air
KEYSEATER. ¾" & 2½" Mitts & Merrill
LATHE. 14"x6' American geared head
LATHE. 16"x8' & 16"x10' L. & S. grd. hd.
LATHE. 20"x8' Walcott, taper & relieving
LATHE. 26"x12' Wickes
LATHE. Nos. 4, 6 & 3A W. & Swasey turret
LATHE. 24" Bullard vertical turret
LATHE. 8" Sundstrand stub
LATHE. Nos. 9 & 12 LeBlond Multicut
MILL, BORING. 42" King
MILL, BORING. 60" Gisholt
MILL, BORING. 100" Betts
MILLER, Nos. 2, 3 & 4 Cincinnati
MILLER. Nos. 2 & 3A Hvy. B. & Sharpe
MILLER. No. 2 Brown & Sharpe vert.
MILLER. 24" Cincinnati duplex
MILLER. 24" & 48" Cincinnati auto.
MILLER. 24" & 48" Newton rotary
PLANER. 24"x24"x 6' Liberty openside
PLANER. 30"x30"x12' Cleveland openside
PLANER. 36"x36"x 8' & 36"x36"x12' Gray
PLANER. 36"x36"x16' Cleveland openside
PLANER. 48"x36"x10' Liberty openside
PRESS. 72" Bliss No. 3G dbl. cr., 4" crank
PRESS. Nos. 1½B & 5A Bliss toggle
PRESS. No. 266 Consolidated cam draw
PRESS. 600 ton Cleveland coining
PRESS. Nos. PG4 & PG5 Ferracute
RIVETER. Nos. 1½B, 2A, 3A, 4A, 5A High Speed
ROLLS. 48" McKay 17 roll leveling
ROLLS. No. 1 Ajax forging
SHAPER. 16" Ohio
SHAPER. 24" Potter & Johnston univ.
SHEAR. 4'x3/16" Niagara squaring
SHEAR. 10'x16 ga. Bertsch squaring
SLOTTER. 20" Betts, MD, PRT
TAPPERS. Nos. 1, 2, 2X, 2BG Garvin
THREADERS. 1", 1½", 2" Landis double
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UPSETTERS. 1", 1½", 4" & 5" Ajax
WELDER. 47 KVA Taylor spot

2000 Tools in Stock.

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30"x12' AMERICAN—16"x8' LODGE & SHIPLEY ENGINE LATHES, Cone Drive with Taper attachment
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AVEY BALL BEARING DRILLS, 1, 2, 3 spindles
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16" Gould & Eberhardt Shaper, cone drive.
24" Gould & Eberhardt Shaper, gear box AC drive.
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4-spindle Allen Drill, power feed to each spindle, MD.

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1300 cu. ft. 22"x13"x16" Ingersoll-Rand Class 10B2
1573 cu. ft. 22"x13"x14" Sullivan Class WN3
2678 cu. ft. 28"x17½"x21" Ingersoll-Rand Class PRE2

ANGLE BENDING ROLL
4"x4"x½" Kling Bros. With extended base for geared motor drive. Rolls 18" dia. x 10" face

BENDING ROLLS—Pyramid Type—Drop End Housing
10' Ryerson, Belt Driven. Capacity ½" Plate. Top Roll 12", Bottom Rolls 9" diameter
22' Wickes, Geared Motor Drive. Capacity ¾" Plate. Top Roll 21", Bottom Rolls 15" dia.

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4" bar Toledo Floor Type, Motor Driven. QCG.
6" bar Niles Knee Type, Arranged for Motor Drive
7" bar Floor Type, Arranged for A.C. Motor Drive

BALER
Logemann Double, All Steel. Size of Bales 57"x9"x13". Each Hopper is 42"x16"x13"

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2½", 3", 3½", 5" Ajax Steel Frame
5" AJAX HEAVY DUTY NEW MODEL, TWIN GEAR, TOP SUSPENDED HEADER SLIDE. MOTOR BRACKET
2", 5" National Steel Frame

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343 KVA General Electric 2300 v. 3 ph. 60 cy. Generator direct connected to 400 H.P. Rathburn Vertical Oil Engine
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HAMMERS—BOARD DROP—STEAM DROP—STEAM FORGING
Chambersburg, Niles-Bement-Pond, Erie and Billings & Spencer 1200 lb. to 12,000 lb.

LEVELLERS
40" Hilles & Jones, Motor Driven. Capacity ¼"
50" National 17 Roll, 3⅝" diameter rolls
60" National 17 Roll, 4½" diameter rolls
60" Newbold 11 Roll, Arranged for Motor Drive. Capacity 3/16" Plate

PLANERS—OPEN SIDE
36"x36"x16' Cleveland, Belted Motor Drive. One Rail and One Side Head
42"x42"x12' Cleveland, Arranged for Motor Drive. Two Rail and One Side Head
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19 OVERHEAD ELECTRIC TRAVELING CRANES ALL IN ONE PLANT
Various Makes, Capacities and Spans. Complete with 230 Volt D.C. Motors and Controls. Single and Double Hook. Single and Double Trolleys. Building to be dismantled and Cranes must be removed promptly.
Priced low for immediate disposition.
All are in first class operating condition.

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35 ton McMyler Steam (Oil Fired) Traveling Crane 70' Boom, 15' Between Legs, 22' Portal
Link Belt 2 Yard Steel Traveling Crane 100' Span 40' Cantilever, 45' Lift, 150' Length Overall

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32" Bridgeport, Motor Driven. Grinding Wheel 31½" dia. Maximum Length will grind 86"

PRESSES—STRAIGHT SIDE
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No. 78½ Bliss, 10" Stroke, 36" Between Uprights
No. 304 Bliss, 4" Stroke, 18" Between Uprights

PRESSES—TOGGLE DRAWING
No. 412 Bliss, 86" Between Uprights
No. 1018 Bliss, 60" Between Uprights
No. 13 Bliss, 300 ton Capacity, Double Geared

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2000 ton Watson Stillman, 33" Diameter Ram, 36" Stroke, Strain Rods 11" dia. x 13¼'

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450 ton Birdsboro 4-Column Flanging Press, 8'x12' Between Columns, 10' Daylight
500 ton Mesta 4-Column Vertical, 48"x48" Between Columns, 9' Daylight
1200 ton Southwark 4-Column Forging Press, 36"x 48" Between Columns, 82" Daylight

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600 ton Niles-Bement-Pond, 48" Between Parallel Bars, Distance of ram 17". Motor Driven

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150,000 lb. Riehle Bros. Three Screw Universal. Motor Driven. With Autographic Recorder

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1½" Acme Four Spindle, Belt Driven. For tapping ½" to 1½" square or hexagon nuts

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8 "x 4½" Blake & Johnson Single Stand 2 High
4 "x 5 " Torrington Single Stand Two High
8¼ "x10 " Belgian Three Stand Two High
9 "x10 " Columbia Two Stand 2 and 3 High
9 "x14 " Columbia Two Stand 2 and 3 High
10 "x12 " Single Stand Two High Finishing Mill
12 "x15 " Mackintosh Hemphill Single Stand 2 High
12 "x16 " Phila. Single Stand Two High
14 "x24 " Hill Clutch Two Stand Two High
15 "x38 " Waterbury Farrel Single Stand 3 High Rod Mill, Motor Driven. Capacity Round Bars 1⅝" down to ⅜"
20 "x30 " Birmingham Two Stand Two High
22" Lewis Three High Bar Mill, Complete with electric driven feed and tilting tables, runout tables, bull head electric driven thru Fawcus Gear, electric driven pusher for cooling table
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Hilles & Jones, Arranged for Motor Drive. Six Rolls 13⅜" dia. 10'6" Between Housings

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United Engr. & Fdry. Co. Arranged for Motor Drive. 12" Blade. Capacity 3" Square
Doelger & Kirsten No. 4, Belted Motor Drive 36" Blade. Capacity 4" Square

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No. G-36 Yoder, Arranged for Motor Drive. Capacities, 5 cuts No. 11, 11 cuts No. 14, 15 cuts No. 16, 18, 20, 22, 24 gauge

SHEAR—GUILLOTINE TYPE
Garrison Bar Shear Arranged for Motor Drive. Length of Blade 9 1/16". Capacity 5" Rounds

SHEARS—ROTARY
Bliss, Belt Driven. Capacity ⅛" Quickwork No. 6, M. D. Cap. up to ¾" plate

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North Plant of

H. B SMITH COMPANY, Westfield, Mass.

To be sold at Auction

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ELECTRIC CRANES: 10 Electric Cranes by Sheppard, 3 Ton Charging Crane, 2 Ton Electric Bridge Cranes, 2 Sheppard 1 Ton Power Lift Cranes with Cabs, 6 Electric 1 Ton Electric Cab Cranes, 10 Electric Hoists ½ to 2 Ton.

FOUNDRY: 14 Skinner Bros. Heating Units from 4' to 6', Green Rotary Pressure Cupola Blowers No. 5, Roots Pressure Blowers No. 7, 2 Parsons Cupolas 5', Ladles, Firing Shovels, Charging Buckets, 8 Coleman Core Ovens, Gehnrich Electric Oven 5' Steel Core Backs, Steel Gate and Tumbling Barrel, 2 Steel Waste Sand Collectors and Steel Towers, Sturtevant Planning Mill Exhauster, 2 75' Steel Stacks, Priedmore Electric Jolting Machines, Sand Cutters motor drive, Beardsley & Piper Sand Slingers motor drive, 2 New Haven Sand Blast Machines 26x46, 150 Moulding Machines, American Foundry Sand Cutter, No. 72 motor drive, Whitney No. 4, 8 and 10 Cupolas, 60 Cooper Hewitt Mercury Lights, 8 18' Core Ovens Electric Control.

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BOILER HOUSE: 2 No. 60 Smith Boilers, Bigelow 25 H. P. Vertical Steel Boiler, 2 D.M. Dillon Boilers 18'.

OUTSTANDING MACHINE TOOLS

BORING MILLS: 2 Universal Boring Mills 3" Spindle.

MILLING MACHINES: 16 Milling Machines including Beaman & Smith Vertical Spindle Milling Machines 8'40", Becker Universal No. B, 6, 5, 5B, 5C, Kempsmith Automatic Milling Machines, Garvin 3 A.W. Universal, Brown & Sharpe No. 1½, Cincinnati Universal, Brainard.

SHAPERS: Cincinnati, Stockbridge, Smith & Mills, Hendy Shapers 16" to 20".

LATHES: 30 Lathes, including Hendey Yoke Head Quick Change 14x6, Prentice, Fay & Scott, up to 14'.

PLANERS: 4 Planers, up to 14'.

GRINDERS: Cleveland 20x4 Double End Grinder 20x4, 10 H. P. Motor, LeBlond No. 1 Grinder, LeBlond No. 1 Tool Grinder.

RADIAL DRILLS: Niles, Bement & Pond, 4' Radial Drill, Single Pulley, 4' Reed & Prentice.

EVERYTHING WILL BE SOLD PIECE BY PIECE. IMMEDIATE DELIVERY. NO COURT CONFIRMATION NECESSARY. INSPECTION ONE WEEK PRIOR TO THE SALE.

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LARGE STOCK OF High Speed Tools, 100 Chain Hoists, Electric and Hand Drills, Cutters, Reamers, Vises, Steel, Bolts, Nuts, Precision Tools, Micrometers, Calipers, Dividers, Protractors, Pipe Stocks, Wrenches, Tongs, Steel Lockers.

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1—1¼" Four Spindle Cone
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1—No. 33 New Britain
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1—9/16" Model G, Gridley
1—1⅓" Model GA, Gridley
2—4" Model H, Gridley Chuckers
1—2¾" Model A, Cleveland
1—⅞" Model A, Cleveland
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1—⅝" Model B, Cleveland
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1—84" Bullard Vertical
1—72" N-B-Pond Vertical
1—62" N-B-Pond Vertical
1—53" N-B-Pond Vertical
1—60" Colburn Vertical
1—60" Cincinnati Vertical
1—48" Colburn Vertical
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1—109" x 50' N-B-Pond, M.D.
1— 65" x 32' Bement-Miles Heavy Duty
1— 36" x 26' Lodge & Shipley
1— 30" x 16' Houston-S-Gambel
1— 26" x 20' Sidney, Geared Head

PLANERS

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1—72" x 72" x 12' N-B-Pond, M.D.
1—48" x 48" x 18' Cincinnati, M.D.
1—42" x 42" x 22' Cincinnati, M.D.
1—36" x 36" x 14' Gray, M.D.

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1— 72" Cincinnati type G Cutter
1—100" Gould & Eberhardt Hobber

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1—40" x 20' Landis Heavy Duty Plain
1—No. 24 Gardner Disc
1—18" x 84" Landis Plain

MILLERS

1—No. 3 and No. 4 Cincinnati Plain
1—No. 5 Cincinnati Plain

SHAPERS

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1—24" Gould & Eberhardt, S.P.D.
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1—28" Columbia Heavy Duty

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DRILLS—Allen 3 Sp. & 4 Sp. Ball Bearing.
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GRINDERS—Brown & Sharpe No. 2, No. 3 Universal
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14"x6' Hendey-Reed-Prentice
16"x6' Lodge & Shipley Selective M.D. (3)
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20"x14' Hendey M.D.
30"x12' American, M.D., Taper Attach.

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GRINDER, Pratt & Whitney Surface, Ball Brg., M.D.
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GRINDER, No. 70 Heald Duplex, Double Spindle

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LATHE, 30"x10' Reed, M.D., Taper Attachment
LATHES, TURRET, No. 6 Gd. Hd., 1A, 2A, W. & S., M.D.
MILLS, BORING, 54" Colburn, 60" Bickford
MILL, Nos. 2 & 3 Brown & Sharpe, Vert., M.D.
MILLS, Nos. 1½A, 2A & 2B Milwaukee & B. & S.
MILL, No. 3GH Hendey Universal, S.P.D.
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SHAPER PLANER, 24" Coulter Openside
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Nos. 50, 55, 60, 65 and 70 Healds.

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6", 11", 18" Gleason Gear Generators.

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2" Acme Class A Bolt Cutter.
6" Landis Pipe Machine, cone drive.
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1" double spindle Landis Bolt Cutter.
18" Landis Pipe Threader.

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44" Niles, two heads.
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60" Niles Boring Mill, 2 heads.

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No. 5A Brown & Sharpe Univ., S.P.D.
No. 5B Becker Vertical Miller.
No. 4 Cincinnati Univ., S.P.D.
No. 3 Cincinnati High Power Plain, S.P.D.
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No. 3 Kempsmith Universal.

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42"x42"x10' Cleveland Open A.C., M.D.
26"x26"x 8' Cleveland Openside.
36"x36"x10' Gray, 2 Hds.

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2½, 3, 3½, 6' Cinci-Bick., S.P.D.
5'—6' arm American Triple Purpose, S.P.D.
6' arm American Triple Purpose, S.P.D.
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Steptoe 20" BG Shaper with countershaft, 11" vise

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No. 3 B. & S. Plain Miller, cone drive
No. 3 B. & S. Universal Grinder, belt drive
No. 2 B. & S. Surface Grinder with Magnetic Chuck
16"x48" Landis Crank Shaft Grinder
12"x72" Landis Plain Grinder
21"x12' LeBlond Lathe, cone drive
27"x10' Greaves Klusman Lathe, cone drive
27"x10' American 8 speed Geared Hd., S.P.D.
3' American Radial Drill, Gear Box, S.P.D.
4½' Morris Radial Drill, Gear Box, S.P.D.
24" G. & E. Shaper, cone drive
20" Stockbridge Shaper, cone drive
15" P. & J. Shaper, Universal Table, cone drive
6' and 10' Robinson Press brake

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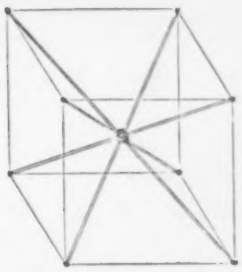

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of reading and using the classified sections—they are full of opportunities.

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Procurement Division, Public Buildings Branch, Washington, D. C., Nov. 16, 1937.—Sealed proposals in duplicate will be publicly opened in this office at 1 P. M., Dec. 21, 1937, for construction of the U. S. P. O., at Meyersdale, Pa. Upon application, one set of drawings and specifications will be supplied free to each general contractor interested in submitting a proposal. The above drawings and specifications MUST be returned to this office. Contractors requiring additional sets may obtain them by purchase from this office at a cost of $5 per set, which will not be returned. Checks offered as payment for drawings and specifications must be made payable to the order of the Treasurer, U. S. Drawings and specifications will not be furnished to contractors who have consistently failed to submit proposals. One set upon request, and when considered in the interests of the Government, will be furnished, in the discretion of the Assistant Director, to builders' exchanges, chambers of commerce or other organizations who will guarantee to make them available for any sub-contractor or material firm interested, and to quantity surveyors, but this privilege will be withdrawn if the sets are not returned after they have accomplished their purpose. W. E. Reynolds, Assistant Director of Procurement, Public Buildings Branch.

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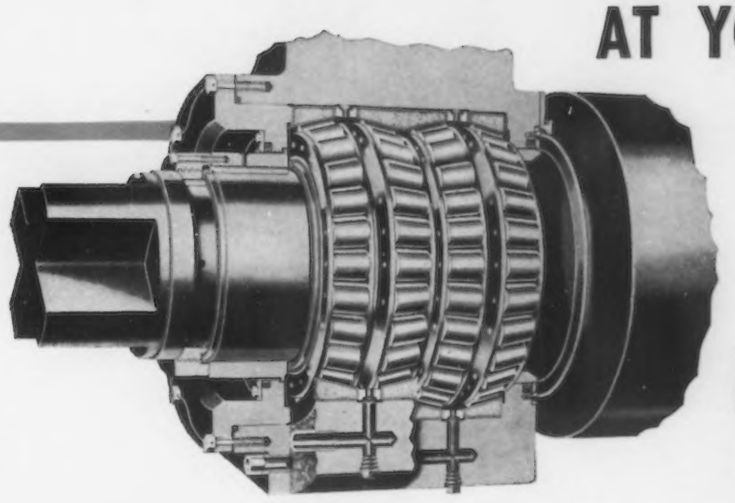

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8 Budd-built Zephyrs are now rolling on TIMKEN Bearings.

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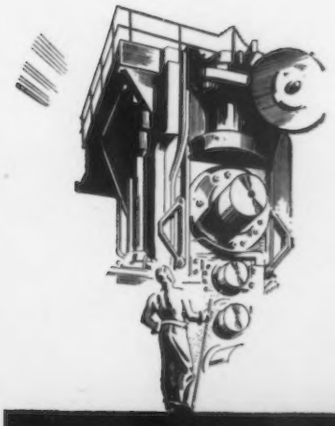
During all these years TIMKEN Roll Neck Bearings have passed every test of rolling mill operation with flying colors and have maintained their position of leadership in the face of every challenge. Competition has only served to bring into still greater relief the superiority of TIMKEN Bearings in accuracy, economy and endurance.



Experimenting with roll neck bearings may be a costly proceeding. TIMKEN Roll Neck Bearings are many years beyond the experimental stage.

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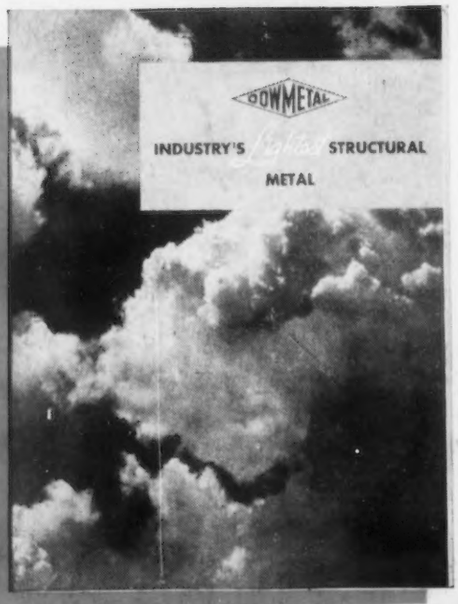
Manufacturers of Timken Tapered Roller Bearings for automobiles, motor trucks, railroad cars and locomotives and all kinds of industrial machinery; Timken Alloy Steels and Carbon and Alloy Seamless Tubing; Timken Rock Bits; and Timken Fuel Injection Equipment.

TIMKEN
TAPERED ROLLER BEARINGS

ILLUSTRATING LIGHTNESS IN PRODUCTS



Just published, this booklet illustrates how the extreme lightness of DOWMETAL* is benefiting the products of many industries. Every manufacturer will be interested in seeing how this lightest of all structural alloys has effected substantial savings in weight, greatly reduced power costs and lessened vibration. And how in every case it has contributed these advantages without sacrifice in strength and durability.

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There is a condensed description of the properties and adaptability of DOWMETAL sand and permanent mold castings, die castings, extruded shapes and forgings. Methods of working, fabricating and finishing DOWMETAL are likewise discussed, along with its excellent machinability.

Every organization producing metal products should have a copy of this booklet. No executive can afford to overlook the advantages of new lightness in his product. Send for your copy of "Industry's Lightest Structural Metal."

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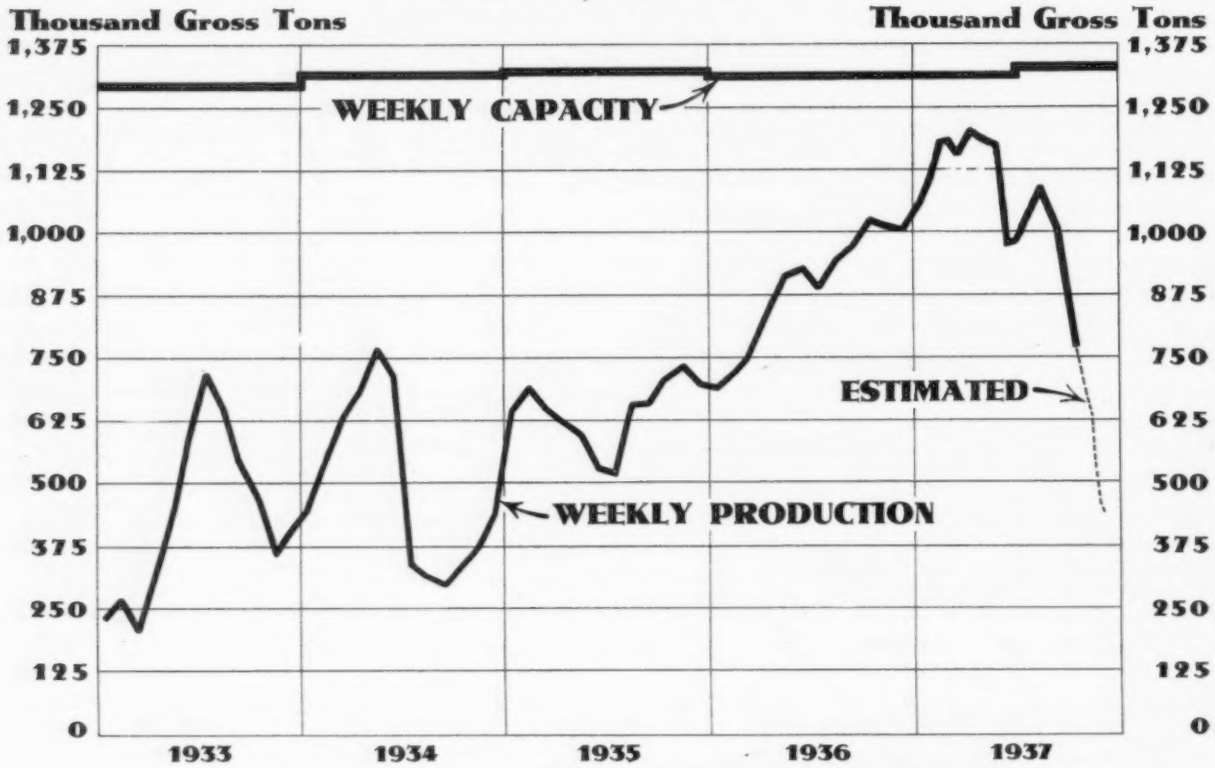
MAGNESIUM ALLOYS
LIGHTEST OF ALL STRUCTURAL METALS

DOWMETAL EXHIBIT—*You are cordially invited to the DOWMETAL Exhibit at the Metals and Plastics Bureau, International Building, Rockefeller Plaza, New York City.*

*Trade Mark Reg. U. S. Pat. Off.

PRODUCTION

Average Weekly Production of Open-Hearth and Bessemer Steel Ingots by Months, 1933-1937, and Estimated Production by Weeks in 1937



Figures for the Current Week Are Not Indicated on the Chart Until the Following Week

STEEL INGOT PRODUCTION BY DISTRICTS: Per Cent of Capacity

	Current Week	Last Week
Pittsburgh	25.0	26.0
Chicago	30.0	30.5
Valleys	28.0	30.0
Philadelphia	34.0	38.0
Cleveland	31.0	29.0
Buffalo	21.5	21.5
Wheeling	56.0	55.0
Southern	46.0	46.0
Ohio River	22.0	27.0
Western	55.0	55.0
St. Louis	19.0	25.0
Detroit	46.0	58.0
Eastern	40.0	50.0
Aggregate	30.0	33.0

Weekly Booking of Construction Steel

	Week Ended				Year to Date	
	Nov. 30, 1937	Nov. 23, 1937	Nov. 2, 1937	Dec. 1, 1936	1937	1936
Fabricated structural steel awards	11,750	6,500	12,000	25,210	987,335	973,605
Fabricated plate awards	2,275	800	2,515	415	111,065	205,375
Steel sheet piling awards	1,200	0	185	1,195	63,815	53,970
Reinforcing bar awards	950	4,375	6,375	4,200	279,875	314,830
Total Lettings of Construction Steel	16,175	11,678	21,075	31,020	1,442,090	1,547,780

. . . .SUMMARY OF THE WEEK. . . .

▼ ▼ ▼

. . . Ingot production at 30 per cent may have hit bottom.

o o o

. . . President Roosevelt injects price situation in housing message.

o o o

. . . Scrap markets go no lower; Lake ore movement 62,598,836 tons.

THE possibility that the decline in steel ingot production has been checked at approximately this week's estimated rate of 30 per cent is suggested by the course of operations in various districts, with some minor ups and downs and unchanged output elsewhere. A sidewise movement of small swings is indicated for December, followed by an upward trend in January, but of less than seasonal proportions.

Despite the efforts being exerted at Washington to revive business, it is generally believed that the entire first quarter, at least, will be required for the period of convalescence from the drastic decline that has been experienced in most lines of metalworking production. In his advocacy of lower prices for materials as a stimulant for housing construction on a large scale, President Roosevelt has injected a fresh uncertainty, it being axiomatic in the steel industry that buying is withheld pending any downward adjustment of quotations.

The question of steel prices is so tightly bound up with high wages and prospective advances in freight rates that no easy problem is presented by the President's suggestion, considering that much of the present steel-making cost is directly traceable to the Administration's labor and taxing policies.

OF more immediate promise than the Government's housing program is the prospect of large-scale railroad buying, provided freight rate advances are permitted by the Interstate Commerce Commission with reasonable dispatch. In hearings at Washington the prospect was held out of purchases of 100,000 cars a year and up to 2000 locomotives a year for several years if railroad revenues are made sufficient.

Meanwhile, railroads continue to enter orders for rails and track supplies, though their purchases of other materials are inconsequential.

The Atlantic Coast Line and affiliated roads have placed orders for 50,000 tons of rails and 10,000 tons of fastenings. These roads include the Louisville & Nashville and the Nashville, Chattanooga & St. Louis, whose orders were reported a week ago. The Norfolk & Western has issued an inquiry for 25,000 tons of rails and fastenings, the Western Pacific for 22,000 tons and the Kansas City Southern for 5000 tons. The Western Pacific is also inquiring for 400 freight cars. Car shops are quoting on 2000 cars for the South Manchurian Railways, whose inquiry for 25 to 100 locomotives has been pending for some weeks.

The automotive industry is still buying lightly, but December schedules should show improvement, despite reduced operations at some plants, as Ford swings into volume production. Ford suppliers are expected to place steel orders soon.

This week's lettings of fabricated structural steel are less than 12,000 tons, with new projects calling for 14,000 tons, the largest being 5400 tons for another building in the Rockefeller Center group, New York. Bids will be taken Jan. 6 on 8000 tons of plate construction for the Grand Coulee Dam.

NOVEMBER steel buying is estimated by Pittsburgh mills at 16 per cent less than that of October. Some mills report, however, that tonnage in the latter half of November was slightly better than in the first half.

For the first time since late August there has been no decline this week in prices of steel scrap in any of the important markets. THE IRON AGE composite price is quoted at $12.92 for the third consecutive week. Scrap brokers believe that the decline has been halted, but look for no upward trend until steel production is definitely better.

The Great Lakes ore movement for 1937 has been completed. Shipments total 62,598,836 gross tons, exceeded only by the 1916 and 1929 totals, and were 17,776,813 tons, or 39.66 per cent, above the 44,822,023 tons shipped in 1936. The November movement was only 1,424,679 tons compared with 2,333,472 tons in the same month last year.

Bolt and nut prices have been reaffirmed for the first quarter. An announcement of the 1938 tin plate price is expected this week.

American steel mills may cooperate with the Continental steel cartel in preserving price stability in world export markets, according to cable advices following the meeting of the cartel in Paris. The proposed arrangement covers all products except thin sheets and tubes.

. . . PITTSBURGH . . .

. . . Ingot output down one point at Pittsburgh, up one at Wheeling-Weirton.

o o o

. . . November steel orders about 16% below those of October.

o o o

. . . Business better, however, in latter half of past month.

PITTSBURGH, Nov. 30.—Steel ingot output in the Pittsburgh district this week has declined one point to 25 per cent of capacity. It is logical to believe that bottom or near bottom has been reached. Meanwhile operations are more closely alined with incoming business than at any time in the past year and a half. The Wheeling-Weirton district rate is up one point to 56 per cent of capacity.

November steel specifications for the district as a whole are estimated to be approximately 16 per cent below the volume booked in October, with some companies doing better than this figure and others not as well. It is significant, however, that finished steel orders during the latter part of November were in better volume than during the early part of the month. At least two weeks or more will be required to determine whether a definite new trend has set in. It may be that the volume of incoming business will move sidewise for a while after the decline has been checked.

While hand-to-mouth buying practices persist, orders are a little more numerous and tonnages slightly larger, indicating perhaps that many customers have reached a low point on inventories. Plate and shape specifications and structural inquiries and awards continue to show the most satisfactory performance when contrasted with demand for other steel products.

Norfolk & Western Railway has approved a $3,700,000 buying program to include about 25,000 tons of rails and fastenings.

Japanese interests are inquiring for 2000 freight cars and may be in the market soon for more.

Leading bolt and nut manufacturers have reaffirmed present prices for first quarter delivery.

A tin plate price announcement is expected momentarily, with reaffirmation of present quotations anticipated.

Pig Iron

New business continues on a day-to-day basis and total tonnages placed are no better than a week ago. Shipments have fallen off further and closely approximate incoming business. Many blast furnaces now in operation have been slowed down to meet current conditions.

Semi-Finished Steel

Total bookings during November were somewhat below the volume placed in October. Specifications in the past two or three weeks have been irregular. Some slight improvement is expected in sheet bar demand owing to the year-end custom of advance tin plate rolling. Meanwhile, foreign inquiry has been more active lately but has not developed into firm contracts.

Bars

Weekly sales figures for hot rolled bars are exceedingly irregular owing to hand-to-mouth buying. Specifications during the past week as a whole were not any better than a week ago, although some companies report an increase. A pronounced improvement in specifications is not looked for before the first of the year. There is some indication, however, that the total volume of day-to-day sales is slightly larger than was the case early in November.

Cold Finished Bars

Miscellaneous demand is at its lowest point since the beginning of the recent decline in specifications. Total specifications are affected somewhat by occasional automotive buying, some of which materialized during the past week.

Reinforcing Bars

Inquiries and awards were less numerous during the past week than in the previous period. Tonnages involved are from 100 to 500 tons. Concrete bar specifications during November were below the volume booked in October and total sales during the past week were somewhat under the average for recent weeks.

Plates & Shapes

Both structural inquiries and awards show improvement from previous weeks. An apartment building in New York will require 1300 tons of steel while an office building at Rockefeller Center, New York, will take 5400 tons. American Bridge Co., Pittsburgh, was awarded 1070 tons of material for public school No. 259, New York City. There is no doubt that the current business situation and the Administration's fiscal policies are adversely affecting privately financed building projects.

Railroad Buying

The board of directors of the Norfolk & Western Railway has approved $3,700,000 equipment program which will include at least 25,000 tons of rails and fastenings. The South Manchurian Railroad is inquiring in this country for 2000 freight cars requiring at least 20,000 tons of steel. This is part of the Japanese Railway Ministry building program for 1937-38. It is understood present estimates call for 500 locomotives, 7000 freight cars and 200 passenger cars. No doubt some of this equipment will be fabricated in Japan.

Tubular Products

Tubular goods specifications are about on a par with a week ago. Most producers have by this time replenished stocks which were depleted considerably a few months ago. Production is now closely alined with the volume of incoming business.

Sheets

Sheet specifications are slightly better than a week ago but the total volume of business is still disappointing. Aggregate business booked in November was slightly more than half that placed in October. Fairly prompt delivery is being given in all cases and for

A Comparison of Prices

Market Prices at Date, and One Week, One Month, and One Year Previous
Advances Over Past Week in Heavy Type, Declines in Italics

Rails and Semi-finished Steel

Per Gross Ton:	Nov. 30, 1937	Nov. 23, 1937	Nov. 2 1937	Dec. 1, 1936
Rails, heavy, at mill	$42.50	$42.50	$42.50	$39.00
Light rails, Pittsburgh	43.00	43.00	43.00	35.00
Rerolling billets, Pittsburgh	37.00	37.00	37.00	32.00
Sheet bars, Pittsburgh	37.00	37.00	37.00	32.00
Slabs, Pittsburgh	37.00	37.00	37.00	32.00
Forging billets, Pittsburgh	43.00	43.00	43.00	39.00
Wire rods, Nos. 4 and 5, P'gh	47.00	47.00	47.00	43.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	2.10	2.10	2.10	1.80

Finished Steel

Per Lb.:	Cents	Cents	Cents	Cents
Bars, Pittsburgh	2.45	2.45	2.45	2.05
Bars, Chicago	2.50	2.50	2.50	2.10
Bars, Cleveland	2.50	2.50	2.50	2.10
Bars, New York	2.79	2.79	2.78	2.40
Plates, Pittsburgh	2.25	2.25	2.25	1.90
Plates, Chicago	2.30	2.30	2.30	1.95
Plates, New York	2.54	2.54	2.53	2.19
Structural shapes, Pittsburgh	2.25	2.25	2.25	1.90
Structural shapes, Chicago	2.30	2.30	2.30	1.95
Structural shapes, New York	2.5125	2.5125	2.5025	2.16¼
Cold-finished bars, P'gh	2.90	2.90	2.90	2.35
Hot-rolled strips, P'gh	2.40	2.40	2.40	1.95
Cold-rolled strips, Pittsburgh	3.20	3.20	3.20	2.60
Hot-rolled annealed sheets, No. 24, Pittsburgh	3.15	3.15	3.15	2.80
Hot-rolled annealed sheets, No. 24, Gary	3.25	3.25	3.25	2.90
Sheets, galv., No. 24, P'gh	3.80	3.80	3.80	3.40
Sheets, galv., No. 24, Gary	3.90	3.90	3.90	3.50
Hot-rolled sheets, No. 10, Pittsburgh	2.40	2.40	2.40	2.15
Hot-rolled sheets, No. 10, Gary	2.50	2.50	2.50	2.25
Cold-rolled sheets, No. 20, Pittsburgh	3.55	3.55	3.55	3.25
Cold-rolled sheets, No. 20, Gary	3.65	3.65	3.65	3.35
Wire nails, Pittsburgh	2.75	2.75	2.75	2.25
Wire nails, Chicago dist. mill	2.80	2.80	2.80	2.30
Plain wire, Pittsburgh	2.90	2.90	2.90	2.60
Plain wire, Chicago dist. mill	2.95	2.95	2.95	2.65
Barbed wire, galv., P'gh	3.40	3.40	3.40	2.70
Barbed wire, galv., Chicago dist. mill	3.45	3.45	3.45	2.75
Tin plate, 100-lb. box, P'gh	$5.35	$5.35	$5.35	$5.25

Pig Iron

Per Gross Ton:	Nov. 30, 1937	Nov. 23, 1937	Nov. 2 1937	Dec. 1, 1936
No. 2, fdy., Philadelphia	$25.76	$25.76	$25.76	$22.3132
No. 2, Valley furnace	24.00	24.00	24.00	20.50
No. 2, Southern Cin'ti	23.89	23.89	23.69	20.44
No. 2, Birmingham†	20.38	20.38	20.38	16.88
No. 2, foundry, Chicago*	24.00	24.00	24.00	20.50
Basic, del'd eastern Pa.	25.26	25.26	25.26	21.8132
Basic, Valley furnace	23.50	23.50	23.50	20.00
Malleable, Chicago*	24.00	24.00	24.00	20.50
Malleable, Valley	24.00	24.00	24.00	20.50
L. S. charcoal, Chicago	30.24	30.24	30.04	26.2528
Ferromanganese, seab'd, carlots	102.50	102.50	102.50	75.00

†This quotation is subject to a deduction of 38c. a ton for phosphorus content of 0.70 per cent or higher.

*The switching charge for delivery to foundries in the Chicago district is 60c. per ton.

Scrap

Per Gross Ton:				
Heavy melting steel, P'gh	$13.25	$13.25	$14.75	$17.25
Heavy melting steel, Phila.	13.75	13.75	14.75	14.75
Heavy melting steel, Ch'go	11.75	11.75	13.75	16.50
Carwheels, Chicago	14.50	14.50	16.00	17.00
Carwheels, Philadelphia	16.25	16.25	17.75	16.75
No. 1 cast, Pittsburgh	16.25	16.25	17.25	16.25
No. 1 cast, Philadelphia	16.25	16.25	17.75	16.75
No. 1 cast, Ch'go (net ton)	11.50	11.50	12.25	14.50
No. 1 RR. wrot., Phila.	16.25	16.25	17.75	15.75
No. 1 RR. wrot., Ch'go (net)	9.75	9.75	12.00	14.25

Coke, Connellsville

Per Net Ton at Oven:				
Furnace coke, prompt	$4.25	$4.25	$4.25	$3.75
Foundry coke, prompt	5.00	5.00	5.00	4.25

Metals

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Electrolytic copper, Conn.	10.75	10.75	11.75	10.50
Lake copper, New York	*11.125*	12.125	12.125	10.62½
Tin (Straits), New York	**42.50**	41.625	47.75	51.37½
Zinc, East St. Louis	*5.25*	5.50	5.75	5.05
Zinc, New York	*5.60*	5.85	6.10	5.42½
Lead, St. Louis	4.85	4.85	5.35	5.05
Lead, New York	5.00	5.00	5.50	5.20
Antimony (Asiatic), N. Y.	*14.75*	15.75	17.25	12.50

On export business there are frequent variations from the above prices. Also in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables.

The Iron Age Composite Prices

	Finished Steel	Pig Iron	Steel Scrap
Nov. 30, 1937	2.605c. a Lb.	$23.25 a Gross Ton	$12.92 a Gross Ton
One week ago	2.605c.	23.25	12.92
One month ago	2.605c.	23.25	14.42
One year ago	2.249c.	19.73	16.17
	Based on steel bars, beams, tank plates, wire, rails, black pipe, sheets and hot-rolled strip. These products represent 85 per cent of the United States output.	Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.	Based on No. 1 heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.

	Finished Steel HIGH	Finished Steel LOW	Pig Iron HIGH	Pig Iron LOW	Steel Scrap HIGH	Steel Scrap LOW
1937	2.605c., Mar. 9	2.330c., Mar. 2	$23.25, Mar. 9	$20.25, Feb. 16	$21.92, Mar. 30	$12.92, Nov. 16
1936	2.330c., Dec. 28	2.084c., Mar. 10	19.73, Nov. 24	18.73, Aug. 11	17.75, Dec. 21	12.67, June 9
1935	2.130c., Oct. 1	2.124c., Jan. 8	18.84, Nov. 5	17.83, May 14	13.42, Dec. 10	10.33, April 23
1934	2.199c., Apr. 24	2.008c., Jan. 2	17.90, May 1	16.90, Jan. 27	13.00, Mar. 13	9.50, Sept. 25
1933	2.015c., Oct. 3	1.867c., Apr. 18	16.90, Dec. 5	13.56, Jan. 3	12.25, Aug. 8	6.75, Jan. 3
1932	1.977c., Oct. 4	1.926c., Feb. 2	14.81, Jan. 5	13.56, Dec. 6	8.50, Jan. 12	6.43, July 5
1931	2.037c., Jan. 13	1.945c., Dec. 29	15.90, Jan. 6	14.79, Dec. 15	11.33, Jan. 6	8.50, Dec. 29
1930	2.273c., Jan. 7	2.018c., Dec. 9	18.21, Jan. 7	15.90, Dec. 16	15.00, Feb. 18	11.25, Dec. 9
1929	2.317c., Apr. 2	2.273c., Oct. 29	18.71, May 14	18.21, Dec. 17	17.58, Jan. 29	14.08, Dec. 3
1928	2.286c., Dec. 11	2.217c., July 17	18.59, Nov. 27	17.04, July 24	16.50, Dec. 31	13.08, July 2
1927	2.402c., Jan. 4	2.212c., Nov. 1	19.71, Jan. 4	17.54, Nov. 1	15.25, Jan. 11	13.08, Nov. 22

this reason there is little incentive for forward buying.

Strip

The volume of hot and cold rolled strip specifications during the past week was no better than in the previous period. Some orders are being received from automotive parts makers but tonnages involved are small. Miscellaneous demand continues dull.

Tin Plate

A tin plate price announcement is expected momentarily. Affirmation of present quotations is anticipated. Tin plate operations have receded a few points this week and may be estimated at 62 per cent of capacity. The main support for operations during the remainder of the year is expected to come from advance rolling of 1938 specifications.

Wire

Both manufacturers' and merchant wire sales appear to be holding their own and the total volume of orders during the past week is on a par with the previous period. Aggregate sales in November, however, were below those booked in October.

REINFORCING STEEL

. . . Awards of 950 tons —3175 tons in new projects.

AWARDS

Harrisburg, Pa., 320 tons, finance building, to Sweets Steel Co., Williamsport, Pa.

Hamburg, Pa., 100 tons, tuberculosis hospital, to Bethlehem Steel Co.

Torrance, Pa., 350 tons, hospital, to Sweets Steel Co.

Bakersfield, Cal., 177 tons, high school, to Kyle & Co., Fresno, Cal.

NEW REINFORCING BAR PROJECTS

New York, 150 tons, Canal Street post office; bids in.

Weehawken, N. J., 925 tons, contract MHT-71, main approach roadway and ramp, Lincoln Tunnel; bids received by Port of New York Authority until Dec. 16. Contract also covers 46 tons structural steel, 38 tons cast steel, and small tonnages of wire mesh and cast iron.

State of Pennsylvania, 300 tons, various small projects; bids Dec. 10.

Cincinnati, 400 tons, paving of decks and approaches, Eggleston Avenue viaduct.

Springfield, Ill., 300 tons, Lakeside power house.

Chicago, 170 tons, commercial testing laboratory, Chicago Engineering Works; bids in.

Chicago, 500 tons, merchandise building for A. T. Galt; bids in.

Wichita, Kan., 225 tons, bridge.

Berkeley, Cal., 105 tons, Whittier school; bids opened.

Petaluma, Cal., about 100 tons, sewage disposal plant; bids opened.

Youngstown Sheet & Tube Co. has declared the regular quarterly dividend of $1.37½ per share on the preferred shares, payable Jan. 1, 1938, to shareholders of record Dec. 9, 1937. The regular quarterly common dividend was reduced from $1 per share to 75c. per share and is payable Dec. 20, 1937, instead of Jan. 1, 1938, to shareholders of record Dec. 9, 1937. This will bring the dividend distribution to common shareholders in the year 1937 to $3.25 per share.

RAILROAD BUYING

Western Pacific is inquiring for 50 50-ton gondola cars with drop ends, 100 50-ton flat cars, 250 50-ton steel sheathed box cars.

United States Engineer Office, Federal Building, Honolulu, T. H., asks bids until Dec. 28 for 300 special steel cars (Circular 7).

American Car & Foundry Motors Co. has received orders for 15 motor coaches, 10 for Conestoga Transportation Co., Lancaster, Pa., and five for Memphis Street Railway Co., Memphis, Tenn.

J. G. Brill Co. has received an order for eight modern street cars for Bogota Tramways, Bogota, Colombia, S. A.

South Manchurian Railways are inquiring in this market for 2000 freight cars. An inquiry from the same source for 25 to 100 locomotives is still pending.

Denver & Salt Lake City Railway Co. is inquiring for 16 tenders.

RAILS AND TRACK SUPPLIES

Atlantic Coast Line and affiliated railroads have ordered 50,000 tons of rails and 10,000 tons of accessories, according to an announcement made by Lyman Delano, chairman of the board of the Atlantic Coast Line and Louisville & Nashville. This group of roads includes the Nashville, Chattanooga & St. Louis and the Clinchfield Road. THE IRON AGE last week reported the placing of 20,500 tons by the Louisville & Nashville and 4890 tons by the Nashville, Chattanooga & St. Louis. The Clinchfield has ordered 1500 tons, which would leave about 23,000 tons for the Atlantic Coast Line. The official announcement states that the combined rail order is the largest placed by the roads since 1931. Of the total tonnage, about 26,000 tons was allotted to the Tennessee Coal, Iron & Railroad Co., but the distribution of the remaining tonnage has not been officially stated.

Norfolk & Western has inquired for 25,000 tons of 131-lb. rails and fastenings, which is part of a program of general improvements to cost $3,700,000, according to an official announcement. Other expenditures will be made for shop tools, for 4000 sets of air brakes for freight car application, and construction of storage tracks and an interlocking plant at Devon, W. Va. Extension of the westward passing siding at Dorney, Ohio, a distance of 4190 ft., and expansion of four passenger station tracks at Roanoke are also included in the program.

Western Pacific is inquiring for 22,000 tons rails and fastenings.

Kansas City Southern is in the market for 5000 tons of rails.

..SAN FRANCISCO..

. . . Western Pacific inquires for 22,000 tons of rails and fastenings.

SAN FRANCISCO, Nov. 29.—Inquiry is being made by the Western Pacific Railroad Co. for 22,000 tons rails and fastenings, 50—50-ton low side gondolas with drop ends; 100—50-ton steel underframe flat cars; 250—50-ton steel sheathed, wood-lined box cars. Purchase of the rails will probably be completed within the next fortnight. The railroad will ask soon for bids on materials for the construction of a new locomotive and machine shop at Sacramento, Calif.

Bidding has been set for Jan. 6, 1938, by the Bureau of Reclamation for furnishing and erecting steel penstocks and pump-inlet pipes for the Grand Coulee Dam, Wash. The work involves the furnishing of three 72-in. diameter and 18—18-ft. diameter penstocks and the erection of the penstocks in place in the dam, except the upstream section of each penstock, and the furnishing of 12—14-ft. diameter pump-inlet pipes and the making of all field welds for the pipes after they have been placed in position by the contractor for the construction of the dam.

Award has been made by the Metropolitan Water District, Los Angeles, for 1200 tons of fence posts, 1180 tons of fence fabric, 150 tons of barbed and plain wire material, and for the construction of woven wire fences and gates at certain reservoirs of the Colorado River aqueduct. Successful bidders are: Schedule No. 1, Anchor Post Fence Co., $187,916; schedule No. 2, Pittsburgh Steel Co., $161,540; schedules No. 3, 4, 5, Los Angeles Fencing Co., $63,620.

Relining and reconditioning of the Provo, Utah, furnace of the Columbia Steel Co. is near completion and company officials announce that it will resume the manufacture of pig iron this week.

Tacoma, Wash., calls for bids Dec. 6 for about 500 tons of 36 and 48-in. steel pipe. Kings County, Wash., has rejected all bids on 600 tons cast iron pipe (alternate steel) and fittings.